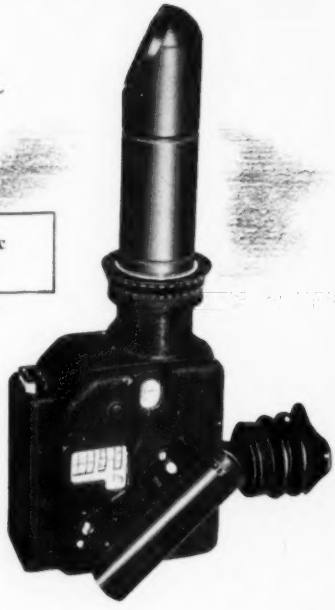
ONE SHILLING
FLIGHT
AND AIRCRAFT ENGINEER
UAT
les Comets
UAT
premiers sur les routes de
l'Union Française

FIX POSITION

Periscopic Sextant

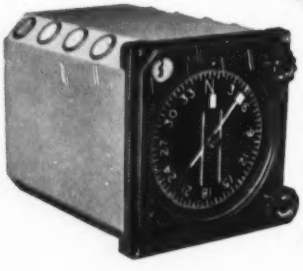


CORRECT TURN

Single Pointer Turn and Slip Indicator

Just five out of the wide variety of Kelvin Hughes precision instruments. Whether for a large airliner or a small glider, all are made and tested with meticulous care. And, of course, behind every instrument are the unrivalled joint Technical Sales and Field Service Departments of Kelvin Hughes and Smiths.

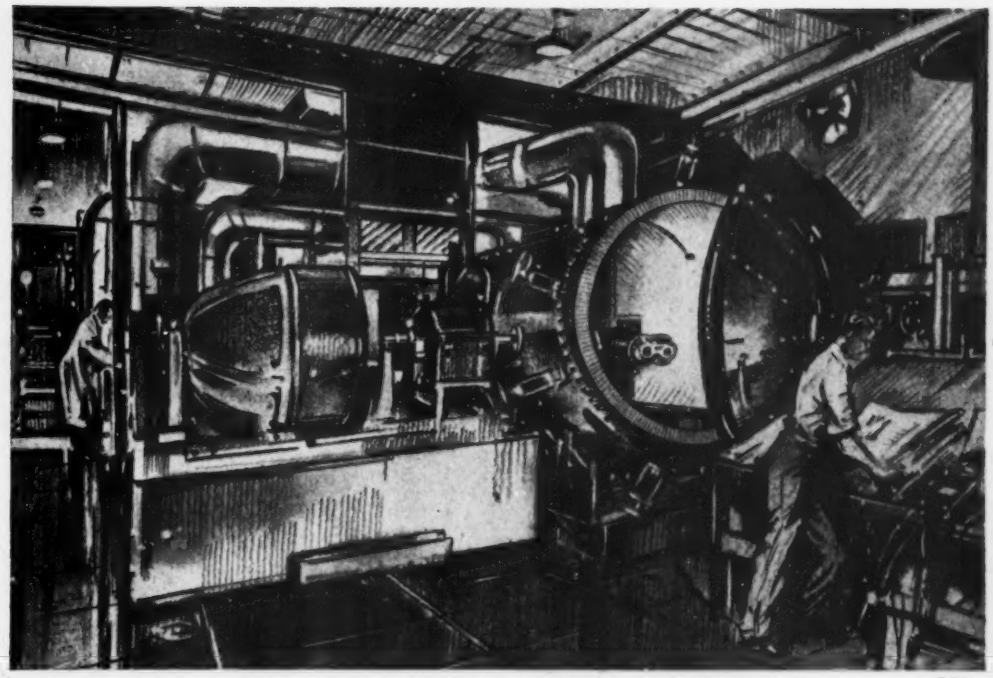
ON COURSE



Left: GM2F Gyro-Magnetic Compass
Above: E2A Compass
Right: P12 Compass

KH KELVIN & HUGHES
(AVIATION) LIMITED
BARKINGSIDE & BASINGSTOKE

Sole Sales Concessionaires:
SMITHS AIRCRAFT INSTRUMENTS LIMITED
The Aviation Division of S. Smith & Sons (England) Ltd.
CRICKLEWOOD · LONDON · NW2 · ENGLAND · TELEPHONE: GLADSTONE 3333 · TELEGRAMS: AIRSPEED, TELEX, LONDON



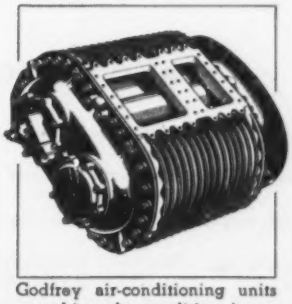
G.P.21

Background story...

Behind the smooth passage of the airliner's flight through the stratosphere is a story of unending research and development.

Behind the conquest of the skies is the unceasing fight for maximum efficiency and the test-house simulation of known, and unknown, conditions.

Only by submitting units to conditions more rigorous than they will meet in practice can an operational safety factor be imposed.



Godfrey air-conditioning units are subjected to conditions in excess of operational requirements by testing in altitude tanks

GODFREY

SIR GEORGE GODFREY & PARTNERS LTD

HANWORTH, MIDDLESEX — HENLEY, OXFORDSHIRE

OVERSEAS COMPANIES, MONTREAL, JOHANNESBURG & MELBOURNE

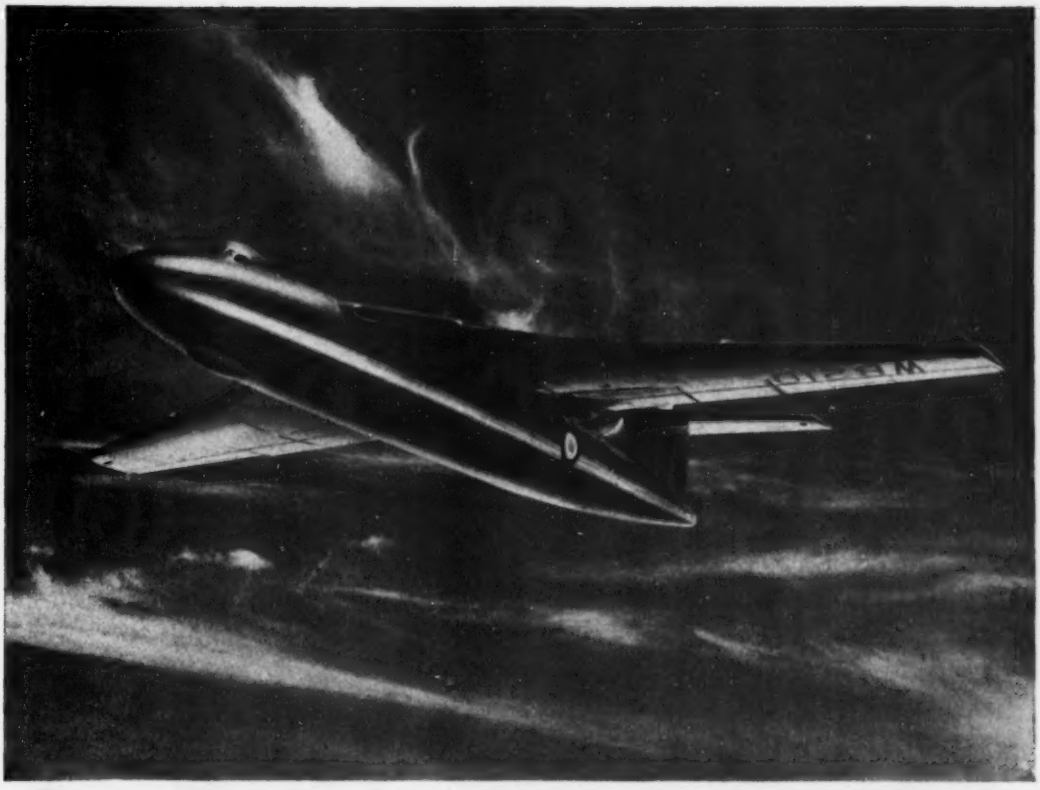
A

make mine a double sleeping draught . . .

We have just spent a sleepless night trying to find superlatives that would adequately describe the New Pacitor fuel contents gauge. We occasionally wondered to ourselves what was the matter with the old Pacitor. Wasn't it a wonderful little gauge, capable of giving accurate readings unaffected by altitude, temperature or aircraft position? It was. Then why the new one? Can it also be used to grind coffee when the aircraft is on the ground? Apparently not. It still only records the contents of each tank individually or all tanks combined on the same dial, but it does that even more accurately. And what is equally important, it is lighter, smaller and easier to service. Well, we didn't find any superlatives but maybe these comparatives will do.

THE **New Pacitor** ELECTRONIC FUEL CONTENTS GAUGE

Enquiries to:
SIMMONDS AEROCESSORIES LTD., BYRON HOUSE, 7-8-9 ST. JAMES'S STREET, LONDON, S.W.1
Manufacturers of NYLOC Self-Locking Nuts
Head Office and Works: Treforest, Glamorgan
Also Birmingham, Stockholm, Melbourne, Sydney and Amsterdam
CRC 31 P

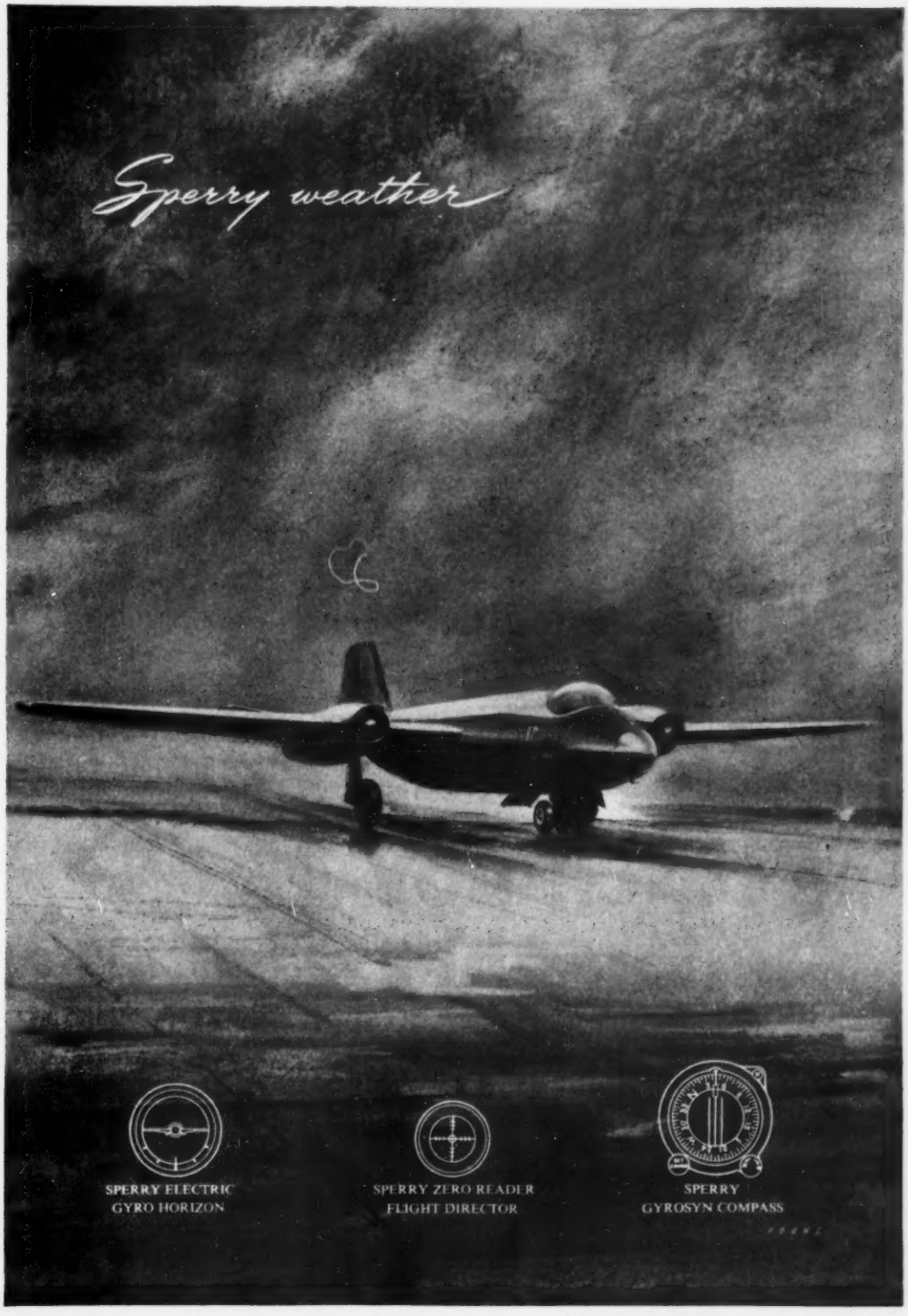


VICKERS VALIANT

Britain's first four-jet bomber
chosen to form the foundation
of the re-equipped long-range bomber
force of the R.A.F.

VICKERS-ARMSTRONGS LIMITED · AIRCRAFT DIVISION · WEYBRIDGE · SURREY

Britain's
LARGEST FREIGHTER
built for the
MINISTRY OF SUPPLY
by BLACKBURN & GENERAL AIRCRAFT LIMITED


Sperry weather
SPERRY ELECTRIC
GYRO HORIZON
SPERRY ZERO READER
FLIGHT DIRECTOR
SPERRY
GYROSYN COMPASS

Best in its class. .

The original masking tape, "Scotch Boy" is still first in the field for all Masking, Holding, Sealing and Protection jobs. Thin, tough and flexible, it sticks at a touch, conforms readily to curves and can be easily and quickly removed.

★ Supplied in rolls 72-yds long and in a variety of widths.

'SCOTCH BOY'
***Masking* TAPE**

ANOTHER 3M COMPANY PRODUCT

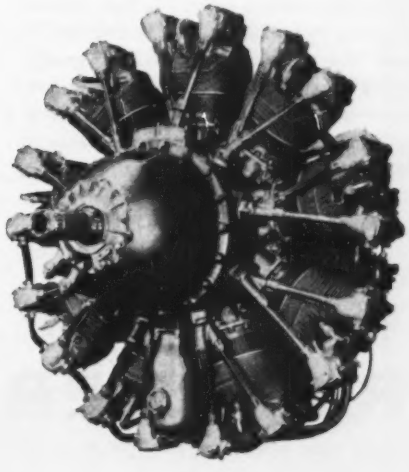
Manufactured by
MINNESOTA MINING & MANUFACTURING COMPANY LIMITED
ARDEN ROAD · ADDERLEY PARK · BIRMINGHAM 8.

Basic Principles

DESIGNED FOR SIMPLICITY OF OPERATION AND MAINTENANCE .....

THE *Percival* "PROVOST" BASIC TRAINER

Chosen for the Royal Air Force, this new side-by-side two-seat basic trainer is powered by a 550 b.h.p. Alvis "Leonides" Series Mk. 2503 engine, the performance figures of which reflect the wise choice of the engine maker in selecting Hobson Injection equipment. This is also fitted to the Alvis "Leonides" Series 502/4 engines which power the Percival "Prince".



Hobson

MASTER CONTROL

INJECTION CARBURETTERS

for maximum reliability and fuel economy

H. M. HOBSON LTD • FORDHOUSES • WOLVERHAMPTON.

Licensees in U.S.A. and Canada: Simmonds Aerocessories Inc.

Safety in the Operating Theatre

The development of antiseptics, following the pioneer work of Lister, has enormously reduced the risk of post-operative infections. In the air, however, fire is the constant enemy . . . flight fires or fires resulting from accidents. The development of Graviner fire protection systems has greatly minimized these risks—and even where Graviner systems are not brought into play, their importance in maintaining crew and passenger confidence is incalculable. Continuous research into new and improved methods of fire detection and fire fighting ensures the maintenance of the pre-eminent position which British aircraft now enjoy in this respect.

Safety in the Air

GRAVINER

Airborne **FIRE PROTECTION EQUIPMENT**

THE GRAVINER MANUFACTURING CO. LTD.
POYLE MILL WORKS, COLNBROOK, BUCKS. *Tel. Colnbrook 48*
G.R.4

Lockheed

SUPER CONSTELLATION ASSURES MANY YEARS OF COMPETITIVE PERFORMANCE

Compared with any of today's certificated aircraft the new Super Constellation is superior in versatility, speed, pay-load, range and ability to earn profit.

The Super Constellation offers a special 97 passenger interior that is quickly converted to a standard luxury interior for 59 passengers, capable of a 3900 mile over-ocean flight with normal airline fuel reserves. It is the first transport designed to use compound engines. With this modern power (3250 horse power engines) it has a maximum speed of 375 miles per hour, a cruising speed of 340 miles per hour, maximum take off weight of 130,000 pounds and maximum landing weight of 105,000 pounds.

Compared with the original Constellation, this much enlarged version offers a 30 per cent. increase in power, a 19 per cent. increase in length, a 24 per cent. increase in gross weight and 67 per cent. more cargo space.

Easy Conversion to Turbo-Propeller Power.

Further proof of the Super Constellation's growth factor is its capability of conversion to turbo-propeller engines with minimum modifications. No structural changes of the empennage, fuselage or basic wing are necessary. Never before has the basic structure of any aircraft provided so adequately for continuing modernization.

Air cooling equipment engineered for the new Super Constellations will have a comfort capacity from 50 to 400 per cent. greater than any other airliner. While on the ground at airports, passenger cabins can be kept at 75 degrees Fahrenheit when the outside temperature is 100 degrees. Heating equipment will maintain 75 degrees Fahrenheit in the plane when it is 60 degrees below zero outside. Pilots' quarters are similarly comfortable.

World's Largest All-Cargo Commercial Transport.

As an all-cargo transport the Super Constellation is the largest produced for commercial use. It has a 38,800 pound maximum payload and will cruise up to 335 miles per hour, depending on load and range. Its main cargo compartment is 84 feet long, longer than 2 standard American railroad freight cars. Total cargo volume is 5,568 cubic feet. It has special one-man loading equipment, including optional built in electric floor conveyor for moving heavy cargo.

Operating cost is the lowest in air cargo history — less than 5¢ per ton mile.

No other modern transport offers so great a combination of advantages.

Leadership demands constant achievement

Lockheed Presents The

SUPER CONSTELLATION

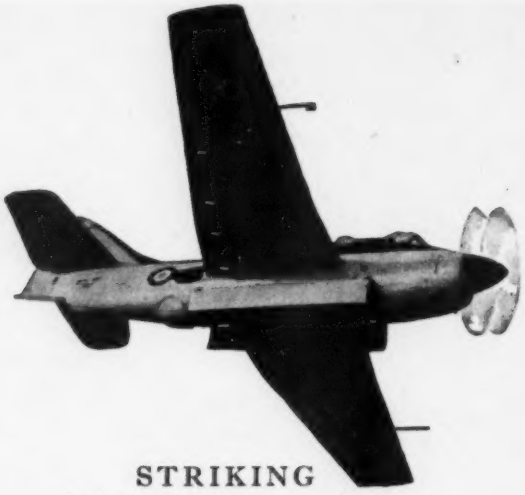
An even finer version of the
World's Most Experienced Airliner

Lockheed's new Super Constellation combines the unmatched record of experience and dependability of the world-famous Constellation with greater speed, greater range, greater comfort and greater size – unquestionably the finest airliner in the world.

Now in service for Eastern Air Lines and soon in service for Trans World Airlines, KLM Royal Dutch Airlines, Air France, Pakistan International, Qantas, Trans-Canada Air Lines, Seaboard & Western Airlines, Braathens S. A. F. E. Air Transport and other leading airlines.

LOCKHEED

AIRCRAFT CORPORATION, BURBANK, CALIF., MARIETTA, GA., U. S. A.



STRIKING

Large bomb bay carries attack weapons

STRIKING DOWN

Double-fold wings are power-folded

FAIREY GANNET

(FAIREY 17)

ARMSTRONG SIDDELEY DOUBLE MAMBA

TWIN-ENGINED • ANTI-SUBMARINE • CARRIER-OPERATED

CHOSEN FOR SERVICE IN THE ROYAL NAVY

THE FAIREY AVIATION COMPANY LIMITED, HAYES, MIDDLESEX

FLIGHT
and
AIRCRAFT ENGINEER

First Aeronautical Weekly in the World

Founded 1909

No. 2256 Vol. LXI. FRIDAY, 18 APRIL 1952

EDITOR
MAURICE A. SMITH, D.F.C.

ASSISTANT EDITOR
H. F. KING, M.B.E.

TECHNICAL EDITOR
C. B. BAILEY-WATSON, B.A.

ART EDITOR
JOHN YOXALL

Editorial, Advertising and Publishing Offices:
DORSET HOUSE,
STAMFORD STREET,
LONDON, S.E.1.

Telegrams, Flightpres, Sodist, London.
Telephone, Waterloo 3333 (60 lines).

Branch Offices:

COVENTRY
8-10, Corporation Street.
Telegrams, Autocar, Coventry.
Telephone, Coventry 5210.

BIRMINGHAM, 2
King Edward House,
New Street.
Telegrams, Autopress, Birmingham.
Telephone, Midland 7191 (7 lines).

MANCHESTER, 3
260, Deansgate.
Telegrams, Iliffe, Manchester.
Telephone, Blackfriars 4412 (3 lines)
Deansgate 3595 (2 lines)

GLASGOW, C.2.
26b, Renfield Street.
Telegrams, Iliffe, Glasgow.
Telephone, Central 1265 (2 lines)

SUBSCRIPTION RATES
Home and Overseas: Twelve months £3 3s. 0d. U.S.A. and Canada, $10.00
BY AIR: To Canada and U.S.A., six months, $16.

IN THIS ISSUE:

Aiglet Trainer in the Air - - - - - 456
Canada's Aircraft Industry - - - - 462
Arctic Armourer - - 465
Brazil's Airline Progress - - - - 467
No. 201 Squadron R.A.F. 469
What Ails Private Flying? - - - - - 476

No Time Like the Present

THERE was a time, not very long ago, when with only minor modification a given aircraft could be adapted equally well to civil or military duties and could do an efficient job under either heading. That condition is now almost a thing of the past, though in trainers some overlap of requirements and duties still exists, particularly in the elementary stages, while feeder-liners can apparently do useful work as flying classrooms. In addition, certain classes of transport may remain a permanent exception. The same remarks are true (though to a lesser extent) of power units and, while military developments will continue to benefit the civil designs which follow them, the one-time interchangeability is no longer practicable. The basic designs of certain military turbojets meet civil requirements also, but the makers say that a great deal of extra development and of detail modification is required to produce a civil power-plant.

This being so, it is in a sense paradoxical that in their calculations the fighting Services should, more than ever before, be taking into account the capacity of civil aviation. Certainly this is to a considerable extent a matter of expediency and, if the national resources permitted, the R.A.F. might build up a much more substantial Transport Command to look after all its needs, regardless of the contribution the civil airlines might be able to make in an emergency.

It is also largely a matter of capacity—money and availability—which makes adaptability or flexibility of duty a virtue in many a new military design. Although a basically good aeroplane can still be expected to make a wider appeal than an average one, there is now a much greater risk of producing one which, while intentionally capable of a diversity of duties, turns out nevertheless to be only mediocre in fulfilling any one of them. The comparative inflexibility of turbojet operations demands specialization.

It follows, then, that the Armed Forces will take an increasingly individualistic course in stating their aircraft requirements in all classes except troop and long-range transports; but, so far as these aircraft are concerned, close co-operation at the design stage between the civil and military customers and the manufacturers is likely to benefit all.

It is learned that the American military authorities and major civil operators are already working together to ensure availability of several standard types of four-engined transport for national service without delay in the event of war. Agreements, it seems, even cover the incorporation at national expense of certain modifications in advance, in readiness for military service.

It is to be hoped that a similar understanding and arrangement exists between the R.A.F. on the one hand and the British Corporations and major independent operators on the other. The formation of Auxiliary Transport Squadrons is a definite indication that kindred matters are slowly developing along the right lines.

It would, in our opinion, be advisable to carry such co-operation forward to an earlier stage in the life of the transport aircraft, and we endorse the proposal of Mr. C. I. Orr-Ewing when he said in Parliament last month: "May I suggest that all aircraft, being designed or produced at the moment, like the Bristol 175, should be designed so that they can take double cargo doors, so that we can have their floors strengthened for military loads, so that tie-down points are provided and all those parts are stock-piled so that if an emergency arises they can be fitted in three weeks? I know the argument is that it would not take long, but in the rush and panic of the early days of a war, we may need our transport aircraft immediately. It will certainly take two or three months to produce all the parts that are necessary to modify these aircraft for military purposes."

Provision for tie-down points and even cargo doors may be reasonably easily made in existing aircraft; strengthened floors, eventually entailing considerable extra structure-weight, would probably constitute more of a problem. There would be no need to convert all transports. It is to be presumed that British civil operators will one day wish to follow the foreign lead and offer pure-freight services in modern pressurized transports on the North Atlantic and other trunk routes. This will create a demand for a civil freighter or transport variant almost indistinguishable from its military counterpart.

Those who know Austers well will be able to detect the absence of 4ft of wing span in the company's latest trainer.
"Flight" photograph

AIGLET TRAINER In the Air

An Economical Machine for Civil and Air Force Schools

No. 47 OF THIS SERIES

By THE EDITOR

LIGHT trainers—elementary, initial, basic, club—are by nature relatively simple, yet not one that I can recall has been introduced and accepted without a good deal of controversy and a degree of criticism. Today, of course, the old 504, to mention one of the best-known veterans, can do no wrong in anyone's eyes, and any adverse opinions there may have been of its luxuriously appointed successor the Tutor have long ago mellowed. The Tiger Moth, too, is aging well, although most reports would have us believe that its not very spacious and rather draughty cockpits no longer hold much attraction for the V.R. pilot

Monoplane Magisters (or Hawk Trainers, as the civil versions are called) have assumed a rather more sporting air in recent years, and the "vicious spin" of their adolescence is forgotten. And so we come to the days of the shapely Chipmunk (the neglected Primer), the lumbering Prentice and the seemingly near-perfect "basic" Provost, all designed to do a job of training, often to a rigid and difficult specification, and representing a compromise in cost, weight, power, performance and accommodation.

But is there a gap in the ranks? The answer, I believe, is yes, for in none of the varied types listed has the intention been simply to provide the essential performance coupled with economy and comfort. But the new Aiglet Trainer goes far towards accomplishing this aim.

It would not be claimed as the best trainer under any single heading, but it is economical to purchase and operate, it is easy to maintain at home or abroad, it will do all that is required in the air, and it is comfortable and roomy as trainers go. For club work it introduces performance and conditions which are likely to be met with when on business or pleasure bent in the future. The seating is side-by-side—but let's not start on that argument—while for what it is worth (and in some circumstances it is quite a lot) it can do several other everyday jobs in addition to training. Delivery time can be quoted in months by the manufacturers, Auster Aircraft Ltd.

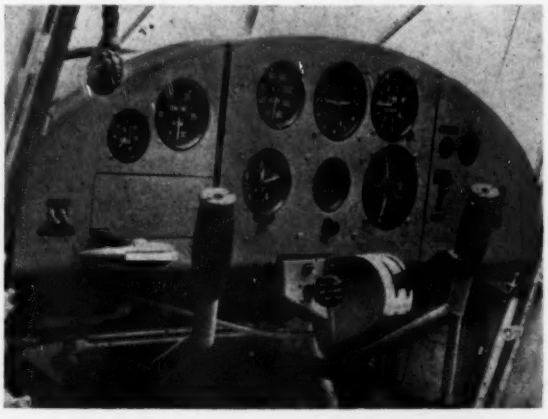
In appearance the Aiglet Trainer is similar to others from its stable; here, of course, is the open secret of its cheapness and the basis for belief in its reliability and economy of operation. It differs, however, in several important respects, more particularly in being stressed and approved for aerobatics and inverted flying. While certain other Austers have been capable of limited aerobatics this one is intended for them. Additionally, a full standard blind panel (price £150), two-stage amber, navigation lights (£32 5s) and radio are provided for. The two extra seats which are also available could be used during navigational training and air experience.

It would be fair to say that the Aiglet Trainer does much to recover the traditional simplicity of the elementary trainer while providing the essentials for modern instruction.

Over a year ago (February 1st, 1951) I gave some preliminary impressions of the Trainer's closest relative, the Aiglet, which to my mind was the liveliest Auster I had flown to date. Now, with its clipped wings (2ft off each tip) and simplified struts, this variant takes the lead under that heading. The structure, being normally stressed for 4½g, is a little heavier than that of the Aiglet (1,320 lb empty as compared with 1,215 lb).

Several of my earlier remarks regarding handling apply to the Trainer, as, for example, my satisfaction with the control on the ground. This is both positive and easy, although the brakes did not seem quite so smooth and progressive in action as those of Goodyear disc-type on the Ambulance/

As neat and simple a cockpit as one could wish, yet all necessities are there. It is preferable to sit directly behind a blind-flying panel, but equally important, on the other hand, to see the dials from both seats.



AUSTER AIGLET TRAINER

130 h.p. de Havilland Gipsy Major 1; Fairey Reed two-bladed metal airscrew

Dimensions and Weights

Span	32ft
Length	23ft 2½in
Maximum weight authorized (normal)	2,200 lb
Maximum weight authorized (aerobatic)	1,950 lb
Empty weight (approx.)	1,320 lb

Performance (with pupil and instructor)

Maximum speed	132 m.p.h.
Cruising speed	112 m.p.h.
Stalling speed (engine off, full flap)	33 m.p.h. I.A.S.
Take-off run	188 yd
Rate of climb at S.L.	710 ft/min
Range (one 16-gal tank, cruising speed)	270 miles
Range (two 16-gal tanks, cruising speed)	500 miles
Approximate safe duration for training (16-gal. tank)	1¼ hr

"Flight" photograph

Neat, even to the absence of all markings, is this Aiglet Trainer seen here on test over Rearsby. The 130 h.p. D.H. Gipsy Major I permits a shapely nose, the lines marred only by the bulky but welcome silencer.

Freighter reviewed in the April 4th issue (my views on flap operation were also expressed at that time). The springing is stiff, but it is suitable for the normal duties of the aircraft.

An electric starter can be provided to order for the Gipsy Major I engine, and a wind-driven generator can be installed in the starboard wing, but why these proprietary units are such expensive extras—£91 10s and £105 respectively—I don't know. The Fairey metal airscrew, which is a standard fitting, helps towards a smooth tick-over, apart from being efficient and looking smart. The Major I engine, it will be recalled, has a 1,500-hr overhaul period.

The cockpit and its fittings are plain but satisfactory and, closely resembling those of other Austers, call for no particular remarks. As mentioned earlier, a two-place, rear bench-seat may be fitted; the width across the front seats is 42in at elbow level.

A simple check—the fuel cock, of twist-selector type, is mounted on the floor—and the lowering of a notch of flap completes the pre-flight preparation, and after a specially careful look-round necessitated by the small blind-spots caused by the wing roots, I felt ready to take off. Flying solo or dual the run is short and the climb-away rapid. There is no appreciable tendency to swing, and one feels confident of the directional control as soon as the throttle is opened. It seemed to me that the Trainer gives more choice of attitude on the take-off run than, say, the Autocrat, for in spite of the rather bumpy field there was no tendency to pitch or leap off prematurely; but when the stick was eased back at about 50 m.p.h. I.A.S., the unstick was positive.

I did not attempt to time the climb, but can believe the 800 ft/min or so claimed for solo flying. I was carrying an almost full fuel tank (16 gallons in the starboard wing root—a second tank can be fitted in the port wing and a 13½-gallon overload tank externally under the belly), and electrical and blind-flying equipment, so the weight was probably about 1,750 lb, or 200 lb below the maximum authorized for aerobatics.

Since it first flew, the Aiglet Trainer has had its ailerons heavied-up a little by altering the gearing. I am not convinced that this is a good thing. They are said now to be better harmonized, but one can push or pull a stick and move a rudder bar with less conscious effort than one can press and hold a stick sideways to roll. While there is even now no great load to overcome (and, in fact, the force may be more representative for military training requirements) I personally like light ailerons with, of course good crisp response and adequate effectiveness. However, these points do not constitute a complaint, for the controls are pleasant enough to operate and, as I subsequently discovered, a good rate of roll can be obtained. According to the figures, the maximum rate is almost 60 deg/sec—a high figure for the type—and this, with full aileron, requires a stick force of 22 lb. By comparison the stick force per g is a little over 6 lb, at cruising speed and under the load conditions already mentioned. The stick force per applied g usually falls between 5 lb and 10 lb for initial trainers.

The Aiglet Trainer is stable and trims well fore and aft. Inverted it is unstable, but plenty of elevator and enough aileron control are available to fly (or, more accurately, glide) that way up.

As with other Austers, the stall is straight and gentle, and in saying that it seemed a little more positive or pronounced, I don't think I am imagining a clipped-wing effect which is not there. With the flaps up and power off, the indicated speed of stall was 40-42 m.p.h.; there was no appreciable warning; recovery was instantaneous. With flap progressively lowered the stalling speed gets less, the minimum being 32-34 m.p.h. I.A.S., but otherwise there is little difference, and on no occasion need much height be lost. If the aircraft is held in the stall, with rudder and ailerons central, it will probably give some signs of starting to spiral or spin to the left, as likely as not only to make a partial recovery on its own. With power on and flaps down, the nose must be extremely high to stall, and then it totters down to the level altitude without discernible height-loss.

I thought the spin was quite like that of the Tiger Moth and very suitable for a trainer. To come out quickly, however, full correct recovery procedure is required, and it is not enough just to centralize controls.

All Aerobatics are On

I admit that I felt slightly guilty about up-ending an Auster in various forms of aerobatics. In the case of the Aiglet Trainer, however, this is no crime; and starting with loops at about 120 m.p.h., and going on to slow rolls at 130 m.p.h. and rolls-off a little faster still, I tried them all. The machine takes them willingly in its stride and, moreover, there is no need to lose height during such evolutions.

The loops calls for no comment. For rolls it is desirable to start with nose fairly high, and one notes how much rudder control is available on the way out. Another point that was brought home to me was my ham-left-handedness. With a central throttle lever (not push-pull) it is, of course, necessary to roll with the left hand, or cross hands to close the throttle. Left-hand loops I could cope with but the rolls were shaky. The engine did not seem to mind if the throttle remained open, and it was left to cut out and in again; but obviously this is a bad practice.

When I began to feel that the meal waiting below would be unwelcome, I gave up aerobatics and attempted the downwind leg of the circuit, inverted. The aircraft kept steady when flown with my right hand, but again my left failed me; I was also surprised at the power of the elevators, up or down, at speeds as low as 70 m.p.h. Next flight, perhaps, I'll try a bunt.

Of the approach and landing it may be said that they are in conformity with the well-known Auster characteristics. The speed of approach should be, perhaps, 5 m.p.h. faster than with the Autocrat, and the rate of descent is slightly more rapid. About 65 m.p.h. I.A.S. seemed a comfortable glide speed, although it would be quite safe to use less, and 50 m.p.h. is enough for the round-out. I liked the feel of the hold-off and touch-down very well, and they should be very suitable for those learning to fly. The final turn-in is, however, rather blind, except downwards, as with any high-winged aircraft, and it is necessary to look before the turn and later to do some rubbernecking if other aircraft on the circuit are to be kept in view.

In conclusion, I may add that I would expect Aiglet-trained pilots, either in military or civil schools, to compare well at 50 hours with those instructed on any other type—and, moreover, the pockets of the operators would be more likely to carry a worthwhile payload.

FROM ALL QUARTERS

BALLISTICS AND OPTICS: First view of two of the new "F"-series Republic F-84 Thunderjets, powered by the Curtiss-Wright J-65 (Armstrong Siddeley Sapphire) turbojet. The machine in the foreground is the fighter/bomber F-84F, and its consort is the RF-84F reconnaissance variant. It will be noted that these machines differ from earlier production Thunderjets in having swept wing and tail surfaces and wing-root intakes.

Making Airline History

AS most readers will be aware, the first pure-jet air service in the world—B.O.A.C.'s de Havilland Comet flights through the Middle East to Johannesburg—are to start on Friday, May 2nd.

No apology is necessary for using the often-overworked term "milestone" in this connection, for the inaugural flight will be one of the most important in the whole history of British commercial aviation. It is our own intention to anticipate the occasion by the publication next Friday, April 25th, of an enlarged number of *Flight* containing special features concerned with the Comet. They will deal with the background of its development; the various home and overseas proving flights already made; operational problems involved in running a jet-airliner service; Comet travel from the passenger's point of view; and other aspects of the subject. The issue will also contain other articles and the usual regular features.

Second Valiant Flies

THE second prototype Vickers-Armstrong Valiant made a successful first flight from the makers' airfield at Wisley, Surrey, on the evening of Good Friday. Flown by Mr. G. R. Bryce, it was airborne for about five minutes. The first prototype, it will be recalled, was lost through fire in the air on January 12th.

The Australian Canberras

THE first Australian-built Canberra is scheduled to leave the Government Aircraft Factory at Fishermen's Bend in October. This news was given last week by Mr. William McMahon, the Australian Air Minister, who went on to express his complete faith in the aircraft. Speaking of four Canberras lost in crashes, —three in England and one in America—since the type first appeared, he said that these accidents did not appear to be due to any single cause, and that investigation had failed to reveal any structural weakness.

Royal Visitors at Acton

ON Wednesday of last week H.R.H. The Duke of Edinburgh took the young Duke of Kent to see the Acton plant of D. Napier and Son, Ltd. The royal visitors were received by Sir George H. Nelson, chairman of the company, and by other members of the board. Exhibiting the keenest interest, they then made an extensive tour of the works which lasted over six hours, including visits to the research and development branches, where they saw the Nomad, and other new power plants.

Marathons for the R.A.F.

THIRTY Marathons have been ordered for the R.A.F. from Handley Page (Reading), Ltd., for use as advanced navigational trainers. For this purpose the aircraft will be equipped with Rebecca Mk 4, Gee, radio compass, astrodomes and tear-drop observation blisters, in addition to the standard radio installations. First deliveries are expected in about three months' time. In service, the Marathons will carry a staff navigator and two students —in aft-facing seats—and a staff pilot and signaller. The aircraft will be called upon to undertake advanced-training flights to points as far afield as Malta and Gibraltar. A photograph appears on page 481 of this issue.

Production of Marathons was originally ordered by the Ministry of Supply, and the numbers concerned were two Mk 1 prototypes, one Mk 2 Mamba-Marathon, and 40 production Mk 1s. So far as we know, this is the total number of Marathon aircraft that are to be built and the majority have, in fact, been completed.

Of the total of production aircraft, six are to be delivered to West African Airways and three to Burma, while the Ministry of Supply may retain one. The R.A.F. order for 30, therefore, takes the rest, and the Ministry of Supply's account is settled. One of the prototypes was lost in an accident in May 1948.

New Chief for 3rd U.S.A.F.

MAJOR-GEN. F. H. GRISWOLD has been appointed Commanding General of the third United States Air Force and is expected to take over his new post in England within a few days. Formerly Director of Production and Requirements for the Munitions Board in Washington, Maj.-Gen. Griswold is 47—the same age as Maj.-Gen. Leon W. Johnson, whom he succeeds.

Easter Records

EIGHTEEN new light-aircraft records were, subject to confirmation, established by Mr. T. W. Hayhow over the Easter holiday. Flying his single-seater Auster Aiglet Trainer (130 h.p. D.H. Gipsy Major) he travelled between London airfields and six European cities, gaining on each the outward, return and out-and-return point-to-point speed records in class C.1B (500-1,000 kg).

On Good Friday, starting from Elstree, he flew to Paris and back in 3hr. 48 min, averaging 113.33 m.p.h.; his outward speed was 110.88 m.p.h. and on return 116.83. In the afternoon he flew Elstree-Ypenberg (The Hague) and back, at 141.29 m.p.h. outward and 117.15 return—127.38 for the whole flight. Next day, April 12th, from Elstree to Brussels (Grimbergen) he averaged 109.9 m.p.h., returning (aided by a tail wind) at 138.76, and averaging 122.2 for the whole flight. In the afternoon Luxembourg was his destination; respective speeds were 122.73, 137.40 and 129.52 m.p.h.

Flying from Croydon Airport on Sunday he established a London-Dublin (Collinstown) record, averaging 126.31, 125.26

"SOMETHING ATTEMPTED . . . ": T. W. Hayhow with the single-seat Auster Aiglet on which he achieved a series of point-to-point records over the Easter holiday (see paragraph above). Note the small-diameter wheels and the absence of the usual short bracing struts.

CRANWELL, the home of the R.A.F. College, is the scene of this fine new aerial study by a "Flight" photographer. On April 9th (shortly after the picture was taken), the Air Minister, Lord De L'Isle and Dudley, V.C., visited the College to take the graduation parade of the 55th (G.D.) and 6th (Equipment and Secretarial) Entries of flight cadets. The ceremony was watched by a visiting party of Swedish Air Force officers and cadets, whose Mustangs, Ju 86 and Dakota are aligned in the foreground.

and 125.26 m.p.h. (the similarity in the return speed and the average for the whole flight is because the time taken to circle the airport is not included in either of the one-way flights, but must be included in the round trip). On Easter Monday Hayhow flew London (Denham)-Amsterdam-London at 123.78, 145.83 and 133.45 m.p.h.—the highest average recorded. Among the Aiglet's equipment was a Decca Navigator. A detailed report on the flights will appear next week.

"Poll Tax" Modifications

THE M.C.A. has decided to modify the scheme, due to become effective on May 1st, by which operators will be charged for services provided at State airports. Briefly, it will involve a charge of 5s. per passenger on aircraft leaving for abroad (instead of arrival taxes of 5s. per passenger arriving from Europe and 7s. 6d. per passenger from farther afield). Inter-continental operators will now pay slightly increased landing fees; international flights of less than 115 miles will, however, qualify for a 50-per-cent. rebate.

Capt. Luby Joins Rotax

WELL known as Director of Engine Research and Development (Air), Ministry of Supply, Captain (E) M. Luby, R.N. (ret.), B.Sc., M.I.Mech.E., F.R.Ae.S., is to resign that post next July in order to become director and general manager of Rotax, Ltd. He will also join the board of Joseph Lucas (Gas Turbine Equipment), Ltd., with responsibility for co-ordination of the aircraft development work carried out by the parent company, Joseph Lucas (Industries), Ltd.

Death of Two Veterans

AS we go to press we learn with regret of the deaths, during the holiday period, of Mr. André Marcel Desoutter, A.F.R.Ae.S., and Mr. J. E. Hodgson, Hon.F.R.Ae.S. Mr. Desoutter, who learned to fly with Blériot in 1911, was managing director of Airports, Ltd., Gatwick; he was 58 years of age. Mr. Hodgson (77) was the author of the classic *History of Aeronautics in Great Britain*, and was responsible for a unique collection of early aeronautical literature.

New I.C.A.O. Secretary-General

SUCCEEDING Dr. Albert Roper as secretary-general of the International Civil Aviation Organization, Hr. Ernst. Ljungberg has now taken over his new duties at the I.C.A.O. headquarters in Montreal. In order to become chief executive officer of I.C.A.O., now supported by 58 member-nations, Hr. Ljungberg gave up his position as president of the Swedish Royal Board of Civil Aviation.

Airscrew with a New Twist

THE standard airscrew for the Blackburn Cirrus Bombardier engines now in production for the Auster B.4 Ambulance/Freighter and A.O.P. B.5 will be an improved version of the 7ft Fairey Reed metal type. In this new, Type B, airscrew the blade-twist will not be carried across the hub; thus there will be no need for front and rear blocks, and the previous hub-thickness of 4½in is reduced to 1 ⅛ in.

The modification has permitted a weight saving of 12 lb, and the 7ft Type B, as installed with locking, bolts and so on, now weighs 39 lb complete. On Auster aircraft, intended only for relatively low speeds, these airscrews are likely to have nose caps instead of the more elaborate spinners.

Speeding the Crews

IN order to achieve its target of 3,000 fully-trained aircrew in the coming year, Flying Training Command is undergoing a major expansion involving the opening of eleven new schools and the provision of many new instructional aircraft.

For regular pilots, No. 1 F.T.S. has re-opened at Moreton-in-Marsh, while the similar schools at Feltwell, Cottesmore and Ternhill are operating at increased capacity. No. 14 F.T.S. has been opened at Holme-on-Spalding Moor, temporarily for the advanced training of National Servicemen. The permanent National Service training schools have been supplemented by a B.F.T.S. at Desford and No. 9 A.F.T.S. at Wellesbourne Mountford; No. 10 A.F.T.S. will open at Pershore in the early summer.

The regular Advanced Flying Schools are all increasing their capacity; in addition, No. 206 A.F.S. was recently opened as an all-weather unit at Oakington, while Nos. 207, 208 and 215 will open this month as day-fighter units at Full Sutton, Merryfield and Finningley. The existing 205 A.F.S. at Middleton St. George has recently changed from day-fighter to the all-weather category.

Navigational training is also expanded, the refresher flying school at Lichfield changing to No. 6 A.N.S. and a new A.N.S. being due to open at Bishops Court (Northern Ireland) shortly.

Deferment for Industry Apprentices

IN the House of Commons on April 10th the Minister of Labour, Sir Walter Monckton, announced that arrangements were being made to allow deferment of call-up for a limited number of men in highly skilled occupations for not more than two years after completion of apprenticeship, where full use was being made of their skill on certain specified re-armament projects of the highest priority, including the latest types of military aircraft.

This concession was subject to the men concerned not being required for service in a Service trade making full use of their skill. Information as to the procedure to be followed was being given to contractors and main sub-contractors.

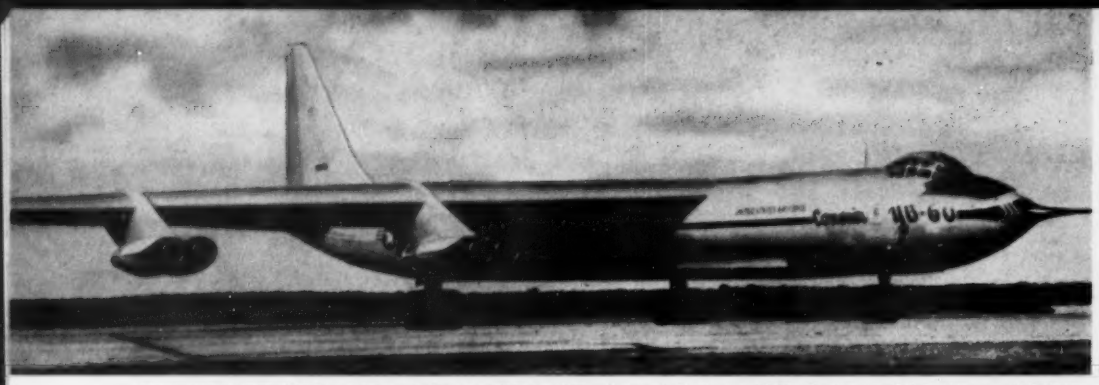
Civil Aviation affairs were the subject of a number of questions in the House on the previous day, April 9th. Mr. John Rankin (Lab., Tradeston) asked the Minister of Civil Aviation, Mr. J. S. Maclay, "why he proposes to return B.E.A. internal services to private enterprise, in view of the fact that the services are now being successfully operated."

In reply, the Minister said that no decision on future policy had been made.

Mr. Maclay was asked by Surgeon-Cdr. Reginald Bennett (Cons., Gosport and Fareham) what circumstances had led to the marked increase in the number of large aircraft flying over the centre of London at low altitude, even at times when the wind was not along the east-west runway at Heath Row; and what was the identity and purpose of the De Havilland Rapide which frequently circled Westminster at about 1,000ft?

Mr. Maclay promised that he would investigate the matter if Dr. Bennett could give him more evidence.

Dr. Bennett obliged handsomely. That very day, he said, a Viking had crossed the House at about 2,000ft, going south-east, others at 9.15 and 10.15, a DC-6 at 10.25 and Vikings at 10.40 and 11 o'clock. He then commented that 30 miles of built-up area had to be flown over if aircraft took this course across London. He wondered if that did not make an accident, such as that which occurred in New Jersey, very probable.



SOUNDING AN OCTAVE : Tests of the eight Pratt and Whitney J-57 turbojets of the Convair YB-60—the jet-propelled development of the B-36—are imminent. In this, the only photograph so far released, the machine bears a striking resemblance to its rival, the Boeing XB-52.

HERE AND THERE

Steam Catapult for U.S. Carrier?

THE U.S. Navy Department stated last week that it was considering redesigning parts of the 60,000-ton carrier *Forrestal*, now building in Virginia, in order to incorporate the British steam-driven catapult. The maintenance carrier H.M.S. *Perseus* has been demonstrating the device to the U.S. Navy, who are reported to be much impressed by its performance.

Hawkers' Blackpool Plans

THAT full-scale production of Hawker jet fighters at Squires Gate, Blackpool, would be reached in 1954 was stated at a recent meeting at which Ministry of Supply and Air Ministry officials discussed with local authorities the construction of the new 2,000-yd main runway at the airfield. Work on the runway, estimated to cost £1,000,000, will begin this summer. The Squires Gate works, one of the largest aircraft factories in Europe, built 3,406 Wellingtons during the war.

Baking-Powder Fire Truck

A DRY chemical largely consisting of ordinary baking soda is the extinguishing medium carried in new R.C.A.F. fire-fighting trucks. Two tons of the powder is stored in each vehicle for discharge—presumably by air or CO_2 pressure—through monitors and/or hoses, and the large proportion of sodium bicarbonate is said to evolve so much CO_2 when heated that severe crash-fires can be extinguished more quickly than by any medium hitherto employed. It is also claimed that the equipment operates satisfactorily at temperatures down to —65 deg F. The chemical is a U.S. development.

Japanese Aviation Concession

THE right to grant flying permits in Japan has been handed over to the Japanese Government as a result of a G.H.Q. Note dated March 10th. The Japanese Civil Aeronautics Agency is now working out arrangements in compliance with the Note, which, of course, refers to civil and commercial flying only. A request for the early release of Haneda Airport, Tokio, has also been made by the Minister of Transport, Giichi Murakami.

Staff Work

THE Royal Aero Club's insignia, a caduceus (Mercury's "staff and serpents") resembles that of certain medical organizations, and it has been suggested by Mr. C. H. Gibbs-Smith that, as the Club has just celebrated its fiftieth birthday, now is a suitable time to alter it. Though no definite decision has been taken, a competition, for a £5 prize, is to be arranged between art schools for a new design.

"Bournemouth" to Fly Again

THE Airship Club's little dirigible *Bournemouth*, which has been undergoing various modifications since it made a few not-completely-successful flights last summer, is in the news again. Arrangements are being made for it to visit Elmdon Airport, Birmingham, on August 30th, when the Midland Aero Club will hold the second of its air displays this year. The club's first display will be at Elmdon on Whit-Monday; the second is being specially arranged for the visit of the airship.

"That's funny—I'm on a rush job, too."

R.A.F. at Royal Tournament

R.A.F. contributions to this year's Royal Tournament at Earls Court (June 4th-21st), are three in number: Illuminated-club swinging (R.A.F. Station Bridgnorth); drill display with band (Catterick); and a police-dog display (Provost Branch, Nethercravon). Airmen (from Cosford) will also take part in the combined P.T. display.

Fact, Fiction or . . . ?

AFTER several years of official scepticism about "flying-saucer" reports, the U.S.A.F. has gone so far as to admit that, while most reports investigated have shown the objects to be either weather balloons or natural phenomena, "there remain a number of reported sightings that cannot be thus explained, and as long as this is true the Air Force will continue to study the problem." The statement, which goes on to invite the public to continue to submit reports (and particularly photographs), is believed to have been prompted by an article in the magazine *Life*, in which the whole subject is critically examined. *Life's* survey ends with these conclusions: "(1) Discs, cylinders, and similar objects of geometrical form, luminous quality, and

DOUBLY INTERESTED, as a former Governor-General of Canada and as our present Minister of Defence, was Earl Alexander, when he greeted A. V-M. C. R. Dunlap, the commandant of the Canadian National Defence College. The Air Vice-Marshal has been visiting this country with some of his staff and students.

EVERY BRITISH AIRCRAFT RELIES ON PLESSEY

For starting gas turbines

Turbine Starter TSC 50

★ Single push button control from cockpit
★ automatic safeguards for engine and starter
★ breechload of six cartridges sufficient for three starts ★ overspeed safety protection ★ flying weight (complete with cartridges) 54.7 lbs. (25kg).

For future developments in Turbine Starting – look to

Plessey

PUMPS · VALVES · CARTRIDGE STARTERS · PREFORMED WIRING SYSTEMS · ELECTRIC ACTUATORS

THE PLESSEY COMPANY LIMITED · ILFORD · ESSEX

AC 33

What other available aircraft...

. . . . . on a mountain top with a bullet through the engine can have a new engine flown in —replaced by two men—and fly back to base (45 miles away) in under 3 hours operation.

only

WESTLAND *HELICOPTERS*

Give you the answer!

NEARLY HALF A MILLION FLYING HOURS SUPPORT WESTLAND'S HELICOPTER LEAD AS EUROPE'S LARGEST MANUFACTURERS OF ROTARY-WINGED AIRCRAFT

HERE AND THERE . . .

solid structure for several years have been, and may be now, actually present in the atmosphere of the earth. (2) Globes of green fire, also of a brightness more intense than the full moon, have frequently passed through the skies. (3) These objects cannot be explained by present science as natural phenomena—but solely as artificial devices created and operated by a high intelligence."

Not-so-hot News ?

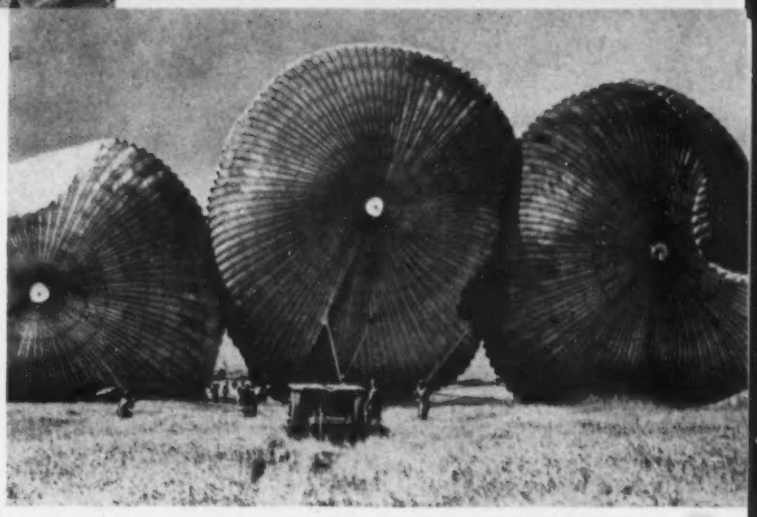
A RECENT newspaper reference to a "refined Queen Bee" radio-controlled target aircraft ordered by the Ministry of Supply is, apparently, without foundation. The target was reported to have an electronic device in the tail, and to have been ordered in large numbers. Enquiries at the Ministry concerned, and at several manufacturers, have failed to confirm the existence of any such target. Is it possible that a reporter has just obtained a scoop on the Airspeed Queen Wasp of *circa* 1937 ?

Cold Posting

THAT the U.S.A.F. base at Thule, on the north-west tip of Greenland, is now nearly ready for occupation by operational units was revealed recently by a sub-committee of the U.S. Senate; Col. Reed, chief of the Army Audit Section, stated that more than £28,500,000 had already been spent on site expenses and on the basic construction. The base, which bears the code-name "Blue Jay," is 2,700 miles from Moscow (great circle route) and 1,875 miles from Fairbanks, Alaska. We were able to publish a photograph of the locality in *Flight* of March 7th.

Tasmanian Aluminium Plan

THE Australian Federal Government is to contribute a further £A4,250,000 capital to develop the aluminium project at Bell Bay in Tasmania. The Federal and Tasmanian Governments are partners in the enterprise, which is expected to produce 15,000 tons of aluminium a year when it is in full production. The Tasmanian Premier, Mr. Cosgrove, says that the plan justifies the Tasmanian Government's policy of using the greater part of its Federal loan money to produce electric power needed for the Bell Bay project.



TAKING-IN SAIL : Men of the U.S. 8081st Airborne Unit hurry to deflate the three vast canopies of parachutes which have just landed a heavy vehicle from a C-119 during exercises in Japan. The intricate design of seams and gores in the canopies is worthy of note.

MR. R. J. ("REG") WOODHAMS, who, as reported last week, has resigned his post as sales and service manager of Air Service Training, Ltd., in order to join another unit of the Hawker Siddeley Group, Sir W. G. Armstrong Whitworth Aircraft, Ltd. He will be concerned with armament projects.

IN BRIEF

A VITAL raw material, mainly obtained from the U.S.A. and lately in short supply, sulphur is now being recovered in commercial quantity at the Shell refinery at Stanlow, Cheshire.

* * *

Recent orders for Bristol Freighters include four for Aer Lingus, four for Iberia (Spain), two for the Royal Iraqui Air Force, one for Aviation Traders and one for Associated Airways of Canada. Repeat orders have been received from Aviaçion y Comercio (Spain) for two aircraft and also from the R.N.Z.A.F. These bring sales of Freighters up to 120.

* * *

"Stacatruc" fork-lift trucks and other handling equipment suitable for the aircraft and allied industries will be exhibited by I.T.D., Ltd., of London (in association with Austin Crompton Parkinson Electric Vehicles, Ltd.) at the Mechanical Handling Exhibition (Olympia, June 4th-14th). The exhibition is organized by *Mechanical Handling*, a journal of the Associated Iliffe Press.

* * *

University students wishing to supplement their academic training by practical experience in industry and commerce are offered employment with the Dunlop Rubber Co. for six or eight weeks during the Long Vacation. There are 100 vacancies, to be filled through appointments officers at the universities, for men and women from the age of 18 upwards, at salaries ranging from £3 to £6 a week.

THE MINISTER OF SUPPLY, Mr. Duncan Sandys, is greeted by Northern Ireland's Minister of Commerce, Mr. W. V. McCleery, upon arrival at Sydenham Airport, Belfast, for a recent visit to the works of Short Brothers and Harland, Ltd. The Devon in which he flew was piloted by Air Marshal Sir John Boothman, Controller of Supplies (Air). Among departments which the Minister inspected was the layout room, in which a large scale-model of the factory and its dispersals has been prepared, showing at a glance the progress-state throughout the organization.

CANADA'S AIRCRAFT INDUSTRY

Part II: The Scene in Detail: Dominion, British-owned and U.S.-sponsored Firms

By JAMES HAY STEVENS

THIS is the second article in the author's review of the Canadian aircraft industry, written after an extended tour of the Dominion. The first contribution was published in "Flight" of April 4th, and the next will appear in an early issue. Last week, separately from this main series of articles, James Hay Stevens gave his impressions of the de Havilland Canada Otter.

THE general picture of the Canadian aircraft industry having been explained, it remains to examine the scene in more detail and with reference to the activities of some of the principal companies. In addition to the work of the big three, the aircraft-design firms of Avro, Canadair and de Havilland, there is much to see in the potentialities of the smaller, and some of the newer, companies whose combined resources are even greater than those of the triumvirate. In order to avoid an anti-climax I propose to deal with the smaller and lesser-known manufacturers first.

There are three types of company in Canada's aircraft industry: the native organizations, the British-sponsored and the American-sponsored. It is a sign of the potentialities of Canada that important firms in this country and the U.S.A. are anxious to set up Canadian companies. Before the war most of these subsidiary concerns were very small and were little more than sales and service branches.

It is, too, sometimes a little difficult to decide where to draw the line with companies that are of Canadian or foreign origin. Some that were started as offshoots of British or American firms are now so well-established that they are more Canadian than the Canadian companies, which may well be "diluted" by emigrant staff. Anyway, at the risk of criticism, I am going to deal with the smaller firms by national groups.

Of the "natives," the most important of the aircraft firms outside the big three is CanCar, the aviation division of the Canadian Car and Foundry Co., Ltd. In fact, the only reason I have not grouped it with the others to make a big four is that the aviation division is only one part of a very mighty whole that makes most of its profits from the building of railway wagons and equipment. Although aircraft are not a primary consideration with CanCar, their productive capacity is great, and since the early days of the war they have repeatedly proved themselves capable of tackling difficult problems and solving them successfully. A case in point was the way they built 1,000 Helldivers for the U.S. Navy in 1944 when that aircraft was in a lamentably complicated state of modification.

In 1939 CanCar designed and built an interesting little biplane fighter and their design interest is sustained by the Norseman VII project. The company has held the rights for the Norduyn Norseman for some years, and has built many hundreds of them, but the "super" Norseman seems now to be in abeyance and serving as little more than showing that the company has its foot in the door for independent design.

The N.A.T.O. training scheme resulted in CanCar receiving a huge contract for Harvards. There are to be some 200 Harvard 4s and 300 T-6Js (the modernized version); the figure quoted is nearly $36,000,000—which, including spares, probably represents about a thousand units in all. This work is being done at Fort William, where the modern, fully-equipped plant of 1,000,000 sq ft employs between 4,000 and 5,000. The first aircraft was announced with an elaborate political ballyhoo visit last October—only to be revealed as having been assembled from war-time spares! This premature publicity caused a lot of adverse Press comment; but the fact remains that most of the first forty airframes to be assembled from war-time parts are now ready and manufacture of the new products is coming along well.

There is some uncertainty about the continued use of the Harvard and T-6J as initial trainers, because of the high accident-rate in the States; and at the time of my visit the R.C.A.F. was toying with the idea of having an *ab initio* trainer like the Chipmunk. Even so, CanCar are in a happy position, since they are the sole Harvard manufacturers today and the only source of spares for the many air forces still using the type.

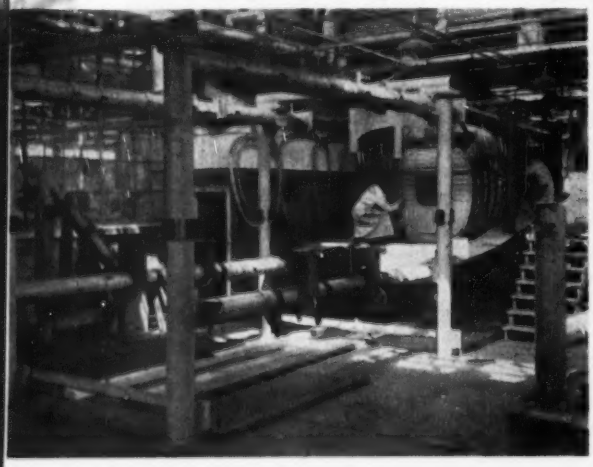
CanCar also have two aircraft factories in Montreal. At St. Laurent (a corner of Cartierville airport) there is a building used for Harvard repair and overhaul which employs about 800 people. However, it seems likely that Canadair, desperately searching for more space with their enlarged F-86, T-33 and T-36 programmes, will take this over before the end of the year. The third CanCar plant—at Point St. Charles, where there are at present about 500 employees—is making airscrews, undercarriage legs and hydraulic units for the Harvard. The airscrews are a new commitment and the first are not expected before August. These will have blades from war surplus stock, as there has been a hold-up in Government procurement of profiling lathes; but, even so, delivery of all-Canadian airscrews should follow in the early autumn.

Raw Materials

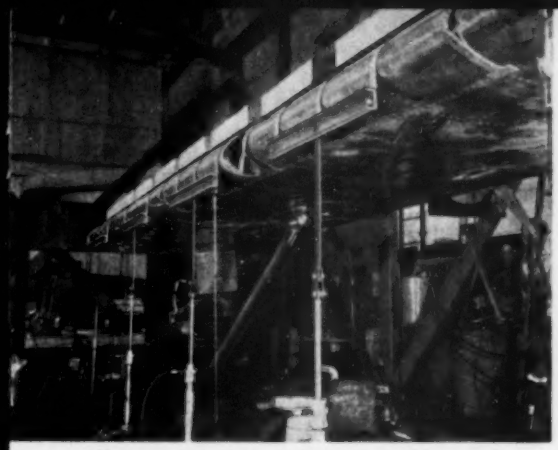
Canada is in a fortunate position for raw materials. Even in the old days of wooden construction, aeroplanes were made mainly from spruce and birch—both native timbers. Nowadays aluminium, magnesium, iron ore, nickel and even titanium are part of the country's vast mineral wealth. Canada has always been known as a major source of bauxite and, next to Scandinavia, it has the richest nickel deposits in the world. It is also worth recalling that the Eastern wastelands held the original pitchblende deposits from which radium was obtained, so that it is reasonable to suppose that other of the heavy radio-active elements will be discovered in quantity. There has also been found recently—in Labrador—a very-high-grade iron ore, which appears to exist in large quantities.

But to return to light metals: Dominion Magnesium, Ltd. (Domal) is the largest producer of magnesium, which is supplied as ingots or in the form of alloys as sheet, bar and extrusions. Of particular interest is the fact that the company has a pilot plant working on the production of titanium. At present, this factory, the only one of its kind in Canada, is producing the metal in ingot form; but if the demand increases, as is very likely, the material will be converted to standard stock for fabrication.

A subsidiary of Domal is Light Alloys, Ltd., of Renfrew near Ottawa, and now about to move into a Government-owned foundry at Haley, Ontario. In this factory, with its 70,000 sq ft of floor space, there will be about 400 workers, and the output is expected to be nearly 200 tons of castings a month. A major



In an article last week James Hay Stevens described the D. H. Canada Otter. This photograph, taken in the maker's factory at Downsview Airport, Toronto, shows the fuselage of the prototype Otter being assembled; the rear cabin bulkhead is being offered up. The first few airframes are to be assembled in large units, but the structure has been designed for manufacture in the sub-assemblies usual today.



An Otter test wing in the "cathedral" frame at Downsview. The firm has carried out all the structural tests on its post-war-designed types.

item in this company's production programme is a series of castings for Avro Orenda turbojets.

MacDonald Bros. Aircraft, Ltd., at Stevenson Airport, Winnipeg, is a large and expanding company that has earned a very high reputation for its overhaul and repair work. Its activities, however, already include manufacture and, despite its thousand-mile separaton from Toronto, it is a most important unit in Canada's re-armament potential. The large, well-equipped plant at present employs over 1,000 people, and has a floor space of some 200,000 sq ft. Both totals are likely to be increased to meet the £5,000,000 contracts already in hand. The bread-and-butter repair of Mustangs and Expeditors for the R.C.A.F. is supplemented by the manufacture of Edo floats—for the Beaver, Norseman and Otter—and stainless-steel, sheet-metal parts for the Orenda. Equipped with 150 kVA seam-welders and 100 kVA spot-welders, and with an automatic argon-arc welder developed by itself, the company is set up to make the tail-cone, jet-pipe and nozzle of the Orenda in quantity. It also has its eye on sheet-metal work for other jet units. In an ancillary capacity, MacDonalds also do a large amount of radio and electronic overhaul work on R.C.A.F. airborne and ground equipment.

A close neighbour of MacDonald's is Standard Aero Engine, Ltd., who used to occupy part of the former's floor-space. They now have their own home in the form of an R.C.A.F. double hangar, and the half of a second one, which gives them almost 38,000 sq ft for their 150 workers. Their equipment is extensive and they claim to be able to overhaul any small piston-engine, including the Franklin, Lycoming and Continental, although they specialize in the Pratt and Whitney Wasp R-1340. At present they have a two-year R.C.A.F. contract for overhaul of the R-1340, and various accessories, amounting to some two and a half million dollars.

Farther west, at Edmonton, Northwest Industries, Ltd., are finding their 140,000 sq ft. and over 500 employees barely adequate for their defence contracts. Their main work is on Dakotas, Harvards and Mitchells, but they do other jobs, such as the winterization of the R.C.A.F.'s first four Bristol 170s. This company is an old-established one, formerly being known as Aircraft Repair, Ltd., when, somewhat paradoxically, it *built* Bellanca Skyrockets under licence. An accredited service-station for Douglas since 1946, it was Northwest that converted the R.C.A.F. Dakota Radio Trainer.

Aircraft Industries of Canada, Ltd., at St. John's, P.Q., have 85,000 sq ft, 250 workpeople and full workshop equipment to tackle aircraft construction and major repairs. They are at present repairing Harvards—mostly badly bent ones.

Aviation Electric, Ltd., with 40,000 sq ft in Montreal, will this summer move into a new factory at St. Laurent, where they will have 71,000 sq ft. They expect to increase their staff from 270 to 400. Although the main activities lie with instrument and electrical accessories, the company has a fully equipped machine shop capable of making any type of small component.

In Cobourg, near Toronto, Canadian Flight Equipment, Ltd., has forty people assembling Mark I Martin-Baker seats for the CF-100. They hold the North American rights for all Martin-Baker products and are getting ready to manufacture this seat and also the later Mark III.

Chatco Steel Products, Ltd., of Tilbury, Ontario, are an integral part of the CF-100 programme, and for nearly a year have been tooling up for fuselage sections, tailplanes, rudders, fins and tail-cones. When production starts there should be room for nearly 1,000 workers, but at present the plant is more or less standing by.

Cockshutt Farm Equipment, Ltd., is a large and very important company to whom aircraft work is little more than a sideline —with, one imagines, an eye to the future. Their aviation division at Brantford, Ontario, is at present tooling for the production of Orenda combustion systems.

Crystal Glass and Plastics, Ltd., Toronto, have an established trade, almost to the point of monopoly, in cockpit canopies, since they make the blown hoods for the CF-100, F-86 and Chipmunk.

Fleet Manufacturing, Ltd., is a pioneer name in Canadian aviation; the firm designed aircraft long before the last war. Today their plant at Fort Erie is mainly employed on the large-scale manufacture of Beaver wings and fuselages as well as work for Avro and the Republic Aviation Corporation; they also make electronic equipment for General Electric and Northern Electric. Although for a couple of years it left the unstable aircraft industry, the company now seems well set with 900 employees and plenty of work.

Also in the Beaver production scheme is Sanderson Aircraft, Ltd., of Malton Airport, a small overhaul firm that now has about 40 workers and 10,000 sq ft devoted to the manufacture of control surfaces, fins and tailplanes.

To conclude this list (which I do not pretend is exhaustive) and to complete the picture of capacty as far as possible of the all-Canadian firms, mention must be made of Carrière and MacFeeter (Toronto), repairers of electrical and radio accessories; the Western Propeller Co., Ltd. (Edmonton), large-scale airscrew repairs; Genaire, Ltd. (St. Catherines), general sub-contractors for small components; and Inaerco, Ltd. and Prenco, Ltd. (Toronto), both specialists in high-pressure hydraulic lines and units. The overhaul shops of Trans-Canada Airlines, at Winnipeg, Canadian Pacific Airlines, and Maritime Central Airways, at Charlottetown, are all engaged on considerable R.C.A.F. maintenance and repair contracts: the first-named expects to handle 120 Expeditors a month by the summer.

From the foregoing it is clear that in the purely Canadian companies alone there is a large potential for the manufacture of airframes, engines and accessories in quantity. It is clear, too, that the Canadian companies are spread widely across the country from east to west. Most factories are well equipped and the extensive experience of management and personnel on major repair work should prove an excellent background for those firms that have not before manufactured new aircraft or components.

British Daughter-Companies

Turning now to the British subsidiaries, we find that Bristol's foothold in the New World neatly straddles the continent, with Bristol Aeroplane Engines (Eastern), Ltd., at Montreal and Bristol Aeroplane Engines (Western), Ltd., at Vancouver. There is also a sales organization, Bristol Aeroplanes of Canada, which recently sold four Freighters to the R.C.A.F. and one to Associated Airways, Ltd. The connections with Canada go back to 1927, when Bristol's bought the erstwhile premises of Canadian Wright Ltd.

The major component is the Eastern factory, which, with some 85,000 sq ft and employing 600, has a current piston-engine repair programme amounting to $17,000,000 from the R.C.A.F. and R.C.N. Rather amusingly, most of the engines are of Rolls-Royce design—some for U.S.A.F. Mustangs. An overhaul-rate of 100 engines a month is no small contribution to the maintenance of N.A.T.O. forces, if not to their actual inception. The Western company is smaller and its 200 employees engaged on the overhaul of 40 engines a month—mainly Centaurus from R.C.N. Sea Furies —do not at present utilize the whole of its 32,000 sq ft of working-space at the Vancouver International Airport.

Dowty Equipment of Canada, Ltd., is well established at Ajax, near Toronto, as a maker of hydraulic and undercarriage components. As well as making Dowty units, it has the licence for Dunlop wheels and brakes. The factory, with some 60,000 sq ft and 250 workpeople, is at present engaged mainly on making units for the CF-100 and reconditioning hydraulic and undercarriage components on the Avro Lancasters that are being brought out of mothballs.

The Fairey Aviation Co. of Canada, Ltd., is a comparative newcomer, being only three years old, and is established at Eastern Passage, near Halifax, Nova Scotia. It is a rapidly growing concern that is looking forward to the day when the present miscellaneous conversion work will give place to large-scale assembly and, perhaps, manufacture. The present floor space is being increased to 208,500 sq ft, with 154,000 available for production, and a further possible extension of 180,000 sq ft. The present staff is 550, which will probably be increased to 700 by the end of the year.

The Field Aviation Co., Ltd., is at Oshawa, Ontario, and in addition to servicing the aircraft of other Hunting Group companies in Canada it maintains the aircraft of the R.C.A.F. Station at Trenton. A fair amount of sub-contracting, particularly sheet-metal work and cable-swaging, is undertaken in this 45,000 sq ft plant by the 200 employees.

The Godfrey Engineering Co., Ltd., of Lachine, P.Q., was

CANADA'S AIRCRAFT INDUSTRY . . .

established in 1947 as a sales and service office under the control of Sir George Godfrey and Partners (Canada) Ltd. In 1949 manufacture of ground equipment for the R.C.A.F. and cabin blowers for T.C.A.'s North Stars was started. Now, all types of pressurization equipment are being made, including the units for the CF-100. The factory is small—about 10,000 sq ft, but is well-equipped and employs some 40 people.

The new factory being built at Toronto for Lucas-Rotax, Ltd., helps to complete the accessory-production picture. It will have nearly 120,000 sq ft of floor space and will employ 1,500. The factory is modern, air-conditioned, very well equipped, and includes test-house facilities and has been designed for expansion. Items on the production schedule at present are: fuel-system components for the Orenda and Nene; turbo-starters; electric starters for the Nene; T-33 starting panels; magneto parts and spares; and marine equipment. Initial production, on the priority Orenda fuel-system and the turbo-starter, is scheduled for the end of the year, with full production by mid-'53. Some work is already in hand in temporary premises, while overhaul and repair work on Lucas and Rotax equipment continues in the old Dorval service centre, which will be closed when the new factory gets into its stride.

Possibly the most interesting British migrant is the one from Derby. In February the foundations were about to be laid for the new plant of Rolls-Royce (Montreal), Ltd., beside the Côte des Liesses, the road from Montreal to Dorval. There is already, of course, the Rolls-Royce sales and service depot at Dorval. The new factory has been established specifically to make Nenes for the Canadair-built Lockheed T-33A trainers, of which 576 are on order. The plant should be ready late in the year, when it will start with 400 workpeople. The schedule is for a three-part programme: first the importation of complete engines from Britain; next assembly of components and testing; and, finally, complete manufacture in Canada, using local material and sub-contractors throughout.

American-sponsored Companies

The third category in this review, as stated earlier, is the U.S.-sponsored firm. American interest in Canadian aviation has been desultory and has constituted a fair barometer of (a) the current wealth of the U.S. factories and (b) the potentialities of the Canadian market. Before the war it was mainly the engine companies and makers of small aircraft that were interested; today it is significant to find the suppliers of equipment and material moving in. Now, though, they face the competition of the native industry and it is not going to be the walk-over that it was with automobiles and many other industrial activities that swept into an almost agrarian Canada in the twenties.

In February this year a new forging plant was opened by Canadian Steel Improvement, Ltd., at Etobicoke near Toronto, for the main purpose of forging turbine and compressor blades for the Orenda. At present this is quite a small plant employing 180 people and having a little over 40,000 sq ft at its disposal; but it is a foothold for the parent company, the Steel Improvement and Forge Co., of Cleveland, Ohio.

Then there is the Canadian General Electric Co., Ltd., whose new factory is going up rapidly beside de Havilland's at Downsview Airport. Ostensibly for the overhaul of the J-47 engines in the F-86Es of the R.C.A.F., it is a modern, well-equipped plant with two towered test-houses. The initial area is only about 25,000 sq ft and it is expected to employ some 200 workers when it comes into operation later this year.

Next, alphabetically, is the Canadian Pratt and Whitney Co., Ltd., which has been established in Canada for 24 years. At present the service and overhaul organization at Longeuil, P.Q., employs about 500 people on a variety of United Aircraft products —Pratt and Whitney engines, Hamilton Standard propellers, Sikorsky helicopters, etc.—and also deals in Pesco accessories. Now, however, a new factory is rapidly nearing completion at Jaques Cartier, a mile from the old works; from it, engines are to be delivered at about the end of the year. The reason for the new factory is an order for 1,000 R-1340 engines placed by the Department of Defence Production for the CanCar Harvard programme. The facilities of this new 320,000 sq ft factory are considerable, and it seems reasonable to regard it as a permanency—particularly as the repair plant is to continue in operation.

Yet another American newcomer in the ancillary field is the Sperry Gyroscope Co. of Canada, Ltd., which is also building a modern factory. The history of this firm is interesting. It was formed only toward the end of 1950, but by February, 1951, it had purchased the Ontario Hughes Owens Co., Ltd., and at once expanded that concern's activities to include the overhaul of Sperry equipment; in January this year it became Sperry Gyroscope Ottawa, Ltd., and in February it announced a new factory on the Côte de Liesse. The steelwork of the 85,000 sq ft plant is already up and work is scheduled to start in August for deliveries late in the year. This very up-to-date factory should employ about 600 in the assembly of instruments for the R.C.A.F. and the other armed forces. Many of the components, in order to meet delivery schedules, are to be sub-contracted to Canadian companies—an interesting indication of the American faith in the Canadian manufacturers' ability to make precision parts.

The Thompson Products Co. has also moved in. This is a large organization, with six plants in the U.S.A., employing 20,000 on engine components alone. The Canadian subsidiary, Thompson Products, Ltd., is a well-known maker of automobile parts and during the war earned a good reputation for making valve inserts, valves and pistons. Now it is building a new plant at St. Catherines on the Niagara Peninsula for the manufacture of light-alloy compressor and stator blades, as well as other turbine parts. Production for Avro, Rolls-Royce, Canadian Pratt and Whitney and U.S. firms is already scheduled. The new plant has 150,000 sq ft of floor area, and is little smaller than the older automobile factory. It is expected to be in operation by the end of the year, when it should be employing some 600 persons.

This is necessarily but an outline of Canada's potential in the aircraft industry, but it should serve to show the backing available for the "big three." Remember also, that it is little more than a review of the main firms specializing in aircraft and major components and accessories: it does not attempt to consider the many hundreds of other factories that are available to make small parts. This aspect will, however, be touched upon when the work of the "big three" is described in the next article.

(To be continued)

HEENAN AND FROUDE JUBILEE

BEST known in the aircraft industry for their dynamometer test equipment, but embracing within their group of associated companies a wide range of engineering products, Heenan and Froude, Ltd., of Worcester, have just celebrated the 50th anniversary of their incorporation.

The late Mr. Hammersley Heenan founded the firm in 1880, shortly afterwards taking into partnership Mr. R. Hurrell Froude, the eldest son of William Froude, F.R.S., inventor of the Froude hydraulic dynamometer and one of the best-known scientists and engineers of his generation. The resultant company was incorporated under its present title in 1902.

Heenan and Froude specialized during their early history in the building of bridges and other steel structures, among which was the Blackpool Tower. The dynamometer, however, soon became the principal product, though later the manufacture of industrial air-coolers and automatic machines for the wire, strip and chain industries formed an increasingly important part of the output.

In 1938, world rights (North America excepted) were secured in the Heenan-Dynamatic dynamometer and the Heenan-Dynamatic coupling, both of which have subsequently been greatly developed. During the last war the company equipped the test sections of the great majority of the shadow factories established to produce vehicle and aircraft power plants; it has been estimated that 98 per cent. of the British-made engines supplied to the R.A.F. and Dominion Air Forces were tested by Heenan and Froude equipment.

It is stated that the company's current order-book is at the highest level ever reached, and that in the case of the larger dynamometers two-thirds of the orders by value are for overseas. Orders are being fulfilled for the U.S.A., Sweden, Norway, Denmark, Holland, Switzerland and many other countries. The most recent contracts are for a 15,000-b.h.p. dynamometer for Holland and one of 13,000-b.h.p. for Switzerland.

LIGHT-ALLOY DATA

TWELVE years ago, the Northern Aluminium Co., Ltd., issued a booklet summarizing the official British specifications for aluminium and its alloys, together with proprietary names of the many materials offered by manufacturers to meet them.

This compact yet comprehensive reference work was soon in great demand and a number of revised versions have since been published. Familiarly known as "the little black book," it now appears in its fifth edition, which retains the general appearance and character of its predecessors, though the arrangement has been improved. Its 81 pages provide a complete index of British Standard and M.O.S. specifications; a list of proprietary names, with the names and addresses of the suppliers; tables of all the proprietary alloys, showing the forms in which they are available and the specifications to which they conform; and, finally, tables of specifications relating to each of the nine forms in which the metal is commonly supplied to manufacturers, with details of composition and mechanical properties demanded by each specification, and the names of the alloys that are available to meet it.

The booklet is published by the Northern Aluminium Co., Ltd., Bush House, London, W.C.2, and Banbury, Oxon.

FIELD'S

A.R.B., A.I.D. APPROVED

OFFER

Comprehensive Aircraft Service

NOTTINGHAM - *Aircraft*

Overhauls
Repairs, Major Modifications
Conversions—Military—Civil
Transportation by Road
Preparations for Flight
Light Component Manufacture
Radio Overhauls

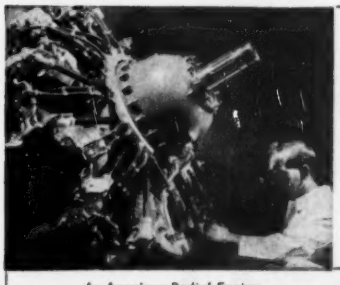
Dakota undergoing final inspection after complete overhaul conversion at Tollerton

CROYDON - *Engines*

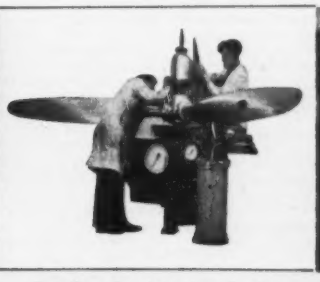
Complete Overhauls
Engine Exchange Schemes
Propeller Overhaul and Exchange
Engine Accessories Overhauls

BOVINGDON *Maintenance and Instruments*

Aircraft Fleet Complete Maintenance · Servicing · Handling · Instrument · Electronics Division · Airframe Accessories Overhauls



An American Radial Engine



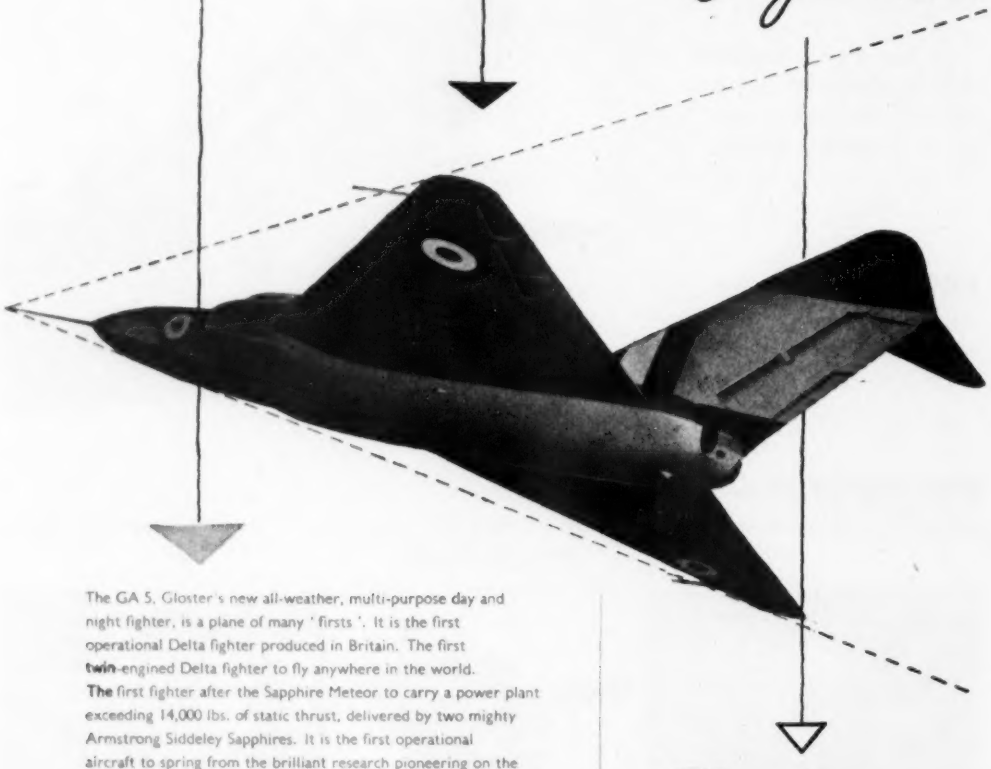
Propeller undergoing tests at Croydon

Part of Instrument Laboratory at Bovingdon

FIELD AIRCRAFT SERVICES LIMITED

CROYDON AIRPORT, CROYDON, SURREY, ENGLAND
Tel.: Croydon 7777 *Cables:* Fieldair, Croydon
A HUNTING GROUP COMPANY
Service Units at
CROYDON, BOVINGDON, NOTTINGHAM, LYMPNE
Overseas Associate Companies: Field Aircraft Engineering Ltd., Canada; Field Aircraft Services Africa Ltd.

First Twin Delta Fighter



The GA 5, Gloster's new all-weather, multi-purpose day and night fighter, is a plane of many 'firsts'. It is the first operational Delta fighter produced in Britain. The first twin-engined Delta fighter to fly anywhere in the world. The first fighter after the Sapphire Meteor to carry a power plant exceeding 14,000 lbs. of static thrust, delivered by two mighty Armstrong Siddeley Sapphires. It is the first operational aircraft to spring from the brilliant research pioneering on the Delta plan-form undertaken by the Hawker Siddeley Group. Such leadership is not surprising, however, when you remember that Gloster also gave the world its first successful turbo-jet aircraft, the historic Whittle E.28/39 and the first jet plane to go into squadron service, the Meteor Mark I in 1944. Being 'first' is a Gloster tradition.

Gloster GA/5

GLOSTER AIRCRAFT LIMITED

Hucclecote, Gloucestershire

MEMBER OF THE HAWKER SIDDELEY GROUP / PIONEER . . . AND WORLD LEADER IN AVIATION

ARCTIC ARMOURER

Or, How to be 100 per cent Efficient at Thirty-eight Below Zero

THIS article is something quite out of the ordinary. Having originated as a report by the R.C.A.F. Winter Experimental Establishment, under the imposing title "Armament Problems in Loading and Arming Aircraft in Cold Weather," it has since appeared, in its present interesting form, in "The Roundel," the journal of the Royal Canadian Air Force, to the Editor of which we acknowledge our indebtedness. It is based on six winters' experience under the severest possible conditions at Fort Churchill, Manitoba, and Watson Lake, Yukon Territory. The author, S/L. E. N. Henderson, enlisted in the R.C.A.F. in 1940 and was posted to England in 1941. He served in No. 400 Sqn until August 1943, when he was posted to No. 39 Wing H.Q. Demobilized in 1945, he rejoined the Service six months later, and went to the Winter Experimental Establishment in 1949.

Arming the 20 mm British Hispano guns of a Hawker Sea Fury.

HELLO! So you're the new armourer—I mean, the new munitions and weapons technician—all set to begin work up here in the frozen north? Good. And it sure *is* frozen this morning. Thirty-eight below outside. Since this is your first day, we'll just take you around and show you what sort of work you'll be doing. As we go, you'll pick up quite a few of the "do's" and "don'ts" about servicing aircraft armament at sub-zero temperatures. . . .

I expect you've heard that cold-weather operations present quite a few problems to armament personnel. And you've heard rightly. All the same, you'll find that some of the difficulties are really only routine and aren't necessarily peculiar to cold weather conditions. But, of course, any difficulty is easier to overcome under normal working conditions than when you're working in the open at thirty-eight below, encumbered by heavy winter clothing. The sharp edge of a fellow's keenness is apt to become a bit blunted under such conditions, and the prime object is to get the job over with and go back inside where it's warm.

We've been tackling the cold-weather problem for several seasons now, and many of the difficulties have been overcome—usually the hard way. Some still remain, though; and new problems will certainly rear their ugly heads with the arrival of new and different equipment. Nevertheless, if you watch how the chaps here go about their work, and take the same precautions that they do, you'll find it a lot easier to carry out your duties efficiently.

First of all, let's take a look at what the well-dressed arctic armourer is wearing.

Working outside at a temperature like today's, a man needs to be dressed for the occasion. You've been issued with your B-25 kit? Fine. You'll need it!—So take care of it and use it properly.

I hope you're wearing some sort of long underwear. Most of the boys around here find that the bottoms of flannelette pyjamas meet the purpose. And I see that you've got on your wool turtle-neck sweater. Okay: now put on the type-C overall trousers and the parka jacket. You'll find that ski-cap affair is just the thing underneath your parka. And now the sheepskin-lined boots and the mitts—inner and outer. By the way, you'd better get yourself a pair of light wool or cotton anti-contact gloves to wear under those mitts. You'll see why when you start working.

You may think you're a pretty bulky object to climb around an aeroplane and load guns and rockets and bombs. I agree; you are. But you can do it all right, and, as the song says, "you'll get used to it."

Well, now that you're dressed, let's go outside to the arming point and get the fighters ready for air firing.

Let's start off with an easy one—a 50 calibre Browning installation in the wing. The gun and ammunition tanks are pretty accessible in a wing gun installation. So here's a screwdriver. Get up on the wing and remove the panel.

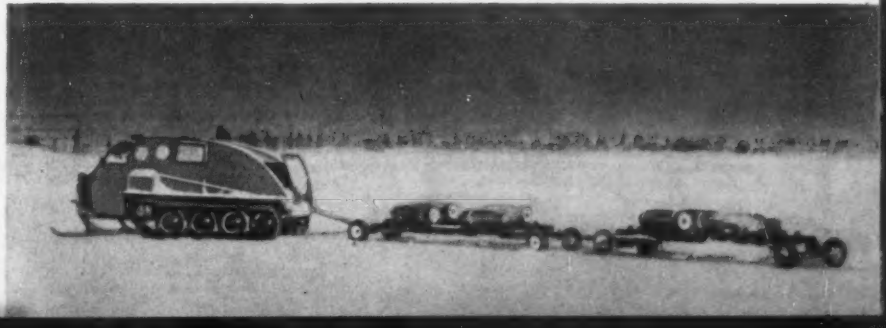
Having trouble already? Quite a job climbing on an aeroplane in full winter kit, isn't it? You'd better let someone help you or you'll be all morning trying to get started.

Just a minute—don't try to walk on that wing. Oops! There you go! Try it on all fours. It's the only safe way to move about on the wing when you're wearing snow-boots.

Now that you've got the panels up, let's take a look at the guns.—Hold it! Don't take your gloves off. If you touch those metal parts with your bare hands you'll get a bad frost-burn—or, if your hands are damp, you'll leave a layer of skin on the gun. Yes, I know it's awkward trying to open the breech-cover with mitts on, but, as I said before, you'll get used to it! This is one of the times you need those anti-contact gloves I was telling you about. If you're wearing them, you can take off the heavy mitts for a few moments to work with small parts that need a fine Italian touch.

All right, just cock the gun once or twice. The breech block moves quite normally, doesn't it? You'll find that the gun functions properly, too. It's been lubricated for this temperature with a light film of mineral oil—hydraulic buffer R.C.A.F. 34A/150 mixed with a 50 per cent volume of kerosine. We use it on all moving parts—and when I say a light film, I mean a light film. The best way to apply the stuff is to soak a piece of clean four-by-two in the oil, wring it out, and then rub it lightly over the bearing surfaces. At sub-zero temperatures, 34A/150 becomes extremely viscous. Today, for example, it would be stiffer than heavy syrup—and you can imagine how that would gum up the working parts! There's no better way of guaranteeing stoppages than by over-lubrication at low temperatures.

Speaking of lubricants, we've found that a mixture of 75 per cent



"Snowmobile" is the expressive name applied by the R.C.A.F. to this type of tractor, used for a variety of purposes, including the towing of trains of bomb-trollies.

ARCTIC ARMOURER . . .

oil—that is, 34A/150—and 25 per cent kerosine is satisfactory for temperatures down to —40 deg F, but below that it's necessary to use 50 per cent kerosine. Today, since it's only 2 deg off forty below we're using the 50/50 mixture. We also use this mixture in the oil buffers of the 50-calibre guns.

Here's the ammunition coming. As soon as you've finished your D.I. we'll load the aeroplane for firing. It'll probably take you about ten minutes to load this morning, but once you're familiar with the installation and used to working in that get-up, you'll probably be able to do the job in five minutes or even less. Incidentally, when you charge the gun, be careful that the ejected rounds are picked up before they get lost in the snow.

Everything accounted for? Good. Now we'll go over to one of the jet fighters with 20 mm guns in the fuselage.

This won't be quite as easy to work on—or rather, work under. The only way to get at the gun installation is to lie down on your back underneath the fuselage. Not that that should be too much of a hardship : the horizontal position comes naturally to most of us.

The riggers have already taken off the gun bay panels, so let's get started.

In this type of installation, the ideal arming team is a Mutt and Jeff combination—provided the big fellow loads the tanks and the little one gets underneath to work on the guns. The combination doesn't work quite so well in reverse. Since you're about average-size, you'll be able to do either job. By the way, look out for any kerosine that may have been spilled under the aircraft. It'll soak into your parka and stay there. It's bad stuff. Quite apart from the smell of it, kerosine doesn't evaporate like gasoline, and your clothes lose their insulating properties. So put that tarpaulin underneath the fuselage before you get down on your back. Try to keep the kerosine off your mitts as well.

Those 20 mm guns, like the 50-calibre Brownings, are fully operative despite the temperature. We use the same lubricants here as we do for the Brownings. A point to remember about 20 mm guns is that if you find it necessary to wash the links before belting the ammunition, be very careful when you lubricate them again. See that you apply only the lightest film of oil. Excessive lubrication of the links at low temperatures will result in stoppages caused by adhesion of the links to the rounds, which will naturally slow the action of the B.F.M. [belt-feed mechanism].

The Fewer the Better

Now that the guns are ready, suppose we start loading the tanks. You might notice first that we use 50-round belts instead of the usual 25-round. Why? The reason's simple. When it's below zero, the fewer belts to join the better. Remember, you can't take your gloves off, and the ammunition is just as cold as everything else here.

The ammunition hatches aren't very big, are they? You have to be careful when you're wearing those great big mitts. If the belt slips as you're lowering it down the chute, the chap underneath will get the whole load on his head. Yes, I know the mitts feel like boxing gloves—but just wait until you try putting the securing-pins in the ammunition chute after you've connected the belt up with the rounds leading into the B.F.M.s ! See what they feel like *then*.

Not too easy, was it? Let's go inside and get warm while the rigger puts the panels back. The coffee ought to be ready now, and we can talk in comfort.

That last job took just over half an hour. Not bad, considering it's your first attempt under these conditions. You'll find that most 20 mm installations of that sort require about 20 minutes for loading and arming even when you're pretty good at it. That's one of the reasons we recommended making up 50-round belts in the cold weather—despite the fact that you've got to be pretty careful when handling them.

There's a bombing operation coming up after lunch, so we may as well spend the rest of the morning at the bomb dump, seeing how the boys are getting on with the fusing.

Here's the truck. Let's go.

We had a pretty heavy snowfall here yesterday, and it's taken half the morning for the snowplough to clear the bomb dump road so that the trucks can get in with the trolleys to pick up the bombs. That's one of the reasons why a planned bomb-dump layout is important for northern field storage. Stockpiles should be arranged so that snow-ploughs can get through the dump and clear the road up to the stacks without blocking other stacks. This isn't as easy as it sounds, when you take into consideration space limitations and explosive storage regulations. A fan-shaped or wide semi-circular layout works pretty well, provided that available space and other local conditions permit. As you can see, we've been using a block pattern layout here, and snow clearance is certainly a problem. Sometimes the boys get out early in the morning and spend two hours cleaning the snow off the stacks, then along comes the plough to clean the roads and covers them in again.

Here's the first trolley-load of bombs.

Take this key-wrench and start removing the plugs ready for fusing.—What's the trouble? Tight, eh? Well, that's not surprising. Those bombs are recent arrivals from the X Depot and the exploder pockets and threads are protected with heavy grease or luting. It's pretty well solid now.

Watch out there !—You're unscrewing the entire base plate. Try again. Now you've got the complete exploder pocket out. You'll have to separate the plug from the exploder housing with a strap wrench.

All of which just goes to show that extra preparation is necessary during the warmer weather. The heavy grease and luting should be removed from all explosive stores, especially from the threaded portions, and replaced with a thin film of light anti-freezing grease.

Now let's take a crack at the components. You won't be able to do much with those mitts on when you start trying to open fuse-containers and so forth. Better let someone else do that until you get some anti-contact gloves. Meanwhile, you can help the chaps who are putting on the tail unit. You'll have to be careful, though. The rivets that hold those spring clips on the tail get to be as brittle as icicles at this temperature. . . .

Well, that took quite a while. We find that it usually requires from ten to 15 minutes to fuse a bomb at sub-zero temperatures—about twice as long as the same operation takes at normal temperatures. However, it's done now; so let's go to the aircraft and get the load aboard.

Bombing-up

This is the loading area—and here comes the aircraft. We'll load the bombs on while the aircrew go back to the mess for an early lunch. The truck towing the energizer is following the aircraft, so we can start right away. The energizer is a mobile electric power plant which serves two purposes in this part of the world. First, it's a source of power to run the winch drive motors, and secondly, we use it to start the aircraft engine. As soon as the aircraft starts, the bomb aimer will fire all the carriers as a last-minute check before they're dropped to be placed on the bombs. After that, those two fellows over there will go inside with the bomb winch and electric drive motor and the cable from the energizer. And a wicked job it is—lugging that winch and a hundred feet of cable through a bomber fuselage.

Everything set? Careful you don't get your signals crossed with the boys inside when they drop the carriers ! Now, let's get the trolley underneath into position. Come on, chaps ! It takes more than three men to move this weight around in the snow.

Now on with the carriers. Don't take your mitts off. Let one of the lads with gloves position the fusing unit and fit the fusing wires —Okay : hook the cable on and start hoisting.

Blast it ! The winch drive motor has gone and seized up. Somebody made a mistake and brought one that wasn't winterized. Send the truck back and get the other—and make it snappy ! It's too cold to stand around here doing nothing.

That's an example for you of what happens if your equipment isn't winterized. That winch motor won't budge with a load on at this temperature. For cold weather operations we lubricate these motors with ANG-25 grease—known to the R.C.A.F. as Grease, Low Temperature General, 34A/192.

—Ah, here we are ! Let's get the job finished. I'm hungry as the devil—and I guess you are, too. How's that other motor? Good. Another 20 minutes and we'll be through—just in time for the aircrew.

Then we can go and eat.

SABRE SUPERIORITY

ON Tuesday, April 1st, U.S.A.F. Sabres were engaged in several big battles on the Korean front. On one occasion 26 of them managed to surprise 16 Mig-15s and attacked before the Communist fighters could jettison their drop-tanks. The ensuing fight was the first for many months in which the American aircraft outnumbered the enemy; five Mig-15s were destroyed in the engagement, of which Col. Gabreski, commander of the 51st Fighter Interceptor Wing, said, "We had a perfect bounce and dived right on their tailpipes."

During the day, ten Migs were destroyed, together with three probables and ten claimed damaged. Apart from last December 13th, when 13 Migs were claimed, this is the highest daily total of the Korean war.

The U.S. Fifth Air Force reports that its aircraft, together with those of attached Allied units, destroyed 37 Mig-15s during March, probably destroyed eight and damaged a further 55; four American fighters were lost in combat and 30 other Allied aircraft were lost through non-combat causes.

Although this is the first time for over a year that the overall monthly total has been in favour of the Allies, it would appear that ground fires, mechanical failures and accidents were responsible for too many write-offs for satisfaction to be felt.

BRAZIL'S AIRLINE PROGRESS

Early History: The Picture Today

By R. G. WALKER

One of the Panair do Brasil Constellations used on the company's routes between Brazil and Europe. These aircraft are known to PAB as the "Bandeirante" fleet.

BRAZILIAN air transport received a big impulse during the war and has made spectacular progress since hostilities ended. The distance flown by national aircraft on regular routes has increased from 4,500,000 miles in 1940 to 54,600,000 in 1950, the number of passengers handled has gone up from 66,000 to 1,700,000, and freight movement has increased from 613 tons to 44,000. Rio and Sao Paulo are now connected by regular lines with more than 250 national and 16 foreign cities, while 100 inland towns are linked up by taxi services radiating from the state capitals.

The first commercial airline, Viaçao Area Rio Grandense (VARIG), was founded in June, 1927 to fly internal routes within the State of Rio Grande do Sul. It was followed in December of that year by the Syndicato Condor, now Serviços Aereos Cruzeiro do Sul, which operated seaplane services from Porto Alegre to the Federal Capital and thence to Natal, in North-East Brazil. In 1930 Nyrba do Brasil, predecessor of Panair do Brasil, was founded and began to work a line from Belem to Porto Alegre. Soon afterwards Viaçao Aerea Sao Paulo (VASP) commenced operating between Sao Paulo and Rio de Janeiro. The combined length of the routes flown by the 19 aircraft of these companies was 24,525 miles.

In 1934, in the Federal District, work was started on the Santos Dumont and Bartolomeu de Gusmao aerodromes, the latter intended for airships, and during the next few years the Department of Civil Aeronautics (D.A.C.) carried out a systematic programme to improve landing facilities. Airports were built at Fortaleza, Recife, Salvador, Belo Horizonte, Curityba, Porto Alegre and Goiania. Additional landing-fields were provided along the various routes and water surfaces were reserved for seaplanes at all ports of call.

In 1940 seven companies, with 79 aircraft, operated on 51 regular routes, having a total length of 40,000 miles, and handled 65,971 passengers and 613 tons of freight. Progress was accelerated during the war. In Brazil communications by rail are practically confined to the south and to the Atlantic coastal belt, leaving vast inland areas unserved. The great majority of the roads are unsurfaced and many become interrupted during the rainy season. At that time surface transportation between North and South Brazil was still restricted to the dangerous sea-route, on which 34 national ships were lost in the war years. The transportation system on land and sea was unable to meet the demand made upon it by unprecedented activity in agricultural, mining and manufacturing centres; an urgent need arose for quick transport to accelerate overseas shipments and domestic distribution. Commodities of small bulk but high intrinsic value were flown to the ports. Cars, lorries, industrial equipment and farm supplies, including pedigree cattle, were conveyed by air to destination. Regular food-transportation services were introduced, the coast towns receiving fruit, vegetables and meat from the interior in exchange for fish.

When hostilities ended, 17 national carriers were operating over Brazilian territory, two had extended their services to Argentina, another was making two round flights weekly between Rio de Janeiro and Miami and, in 1946, the first Brazilian service to Europe was inaugurated. In that year 159 aircraft were operating on 76 regular routes, with a combined length of 65,315 miles; they made 36,061 flights, flew 128,461 hours and 19,284,137 miles, and transported 511,818 passengers and 6,614 tons of freight. Aircrews, excluding stewards, had increased since 1937 from 140 to 1,008.

The success of the national companies and the post-war facilities for obtaining aircraft from the United States provoked a wave of enthusiasm. A campaign was started to stimulate aviation. Private pilots dropped letters over isolated inland towns, urging the inhabitants to build runways, according to directions enclosed, and promising to return and land within a stated time. The townsfolk responded eagerly and the improvised landing fields were later improved. In many districts airports were laid out by municipal authorities and local troops. Periodical "aerial concentrations" were held in different parts of the country under the auspices of the D.A.C. The Air Ministry encouraged the formation of private clubs by paying part of the salaries of instructors and mechanics and by distributing training aircraft free of charge. By June, 1951 358 clubs, with 1,882 machines, were registered and 8,570 pilots had been trained.

In one year five more national carriers were organized and six new routes were opened up, extending the length of regular lines by 6,000 miles. Brazilian aircraft flew 187,163 hours and 28,190,116 miles in 1947, carrying 786,620 passengers and 11,396 tons of freight. The consolidated capital plus reserves of the companies amounted to £9,451,900; and total profits, after deducting losses, represented 5.7 per cent on that sum.

Permits had been granted without sufficient discrimination, however, and the supply of transport over the more travelled routes exceeded the demand. Two companies, formed with insufficient capital during the inflation period, were wound up, and all except three showed a tendency to curtail services. The overall percentage of profits on capital plus reserves dropped to 1.5 in 1948, the balance sheets of eight companies revealed deficits and only two distributed dividends. Rate-cutting had created unfair competition and the general situation was further impaired by the action of speculators.

The policy of the D.A.C. was then adjusted to check the crisis. Speculation was curbed by obliging the organizers of new enterprises to provide the entire capital, and not to call for public subscriptions. Companies were authorized to import aircraft and essential supplies free of customs duties. New tariffs were fixed according to the operational costs of each company, although the same rates were maintained on a given rate and might not exceed specified limits. The ceiling price for passenger fares ranged from 2.40 to 0.90 cruzeiros (11d to 4¼d) per kilometre, and that for freight from 3 cruzeiros (1s 1¾d) per kilogramme on internal lines to 6 cruzeiros on inter-state routes. Regulations were tightened up as regards capital, technical equipment and maintenance, with the result that one or two unstable enterprises were eliminated. Applications to operate over adequately served routes were refused and permits to open others were granted provisionally, subject to confirmation

The Saab Scandia (seen, on the left, at Linköping) was awaiting delivery to Brazil. Originally operated by Aerovias Brasil, it is now one of the six Scandias used on Brazilian domestic routes by VASP. (Right) One of the PBY-5A Canso amphibians used on Panair do Brasil's services from Belem up the Amazon to Iquitos in Peru.

BRAZIL'S AIRLINE PROGRESS . . .

after six months' trial. When strategic or other national interests called for air transport to points of small economic significance the lines were subsidized, usually at the rate of 5s 8½d per kilometre flown. Towards the end of 1948 one carrier began operating to remote points on the Amazon and another to isolated towns in Goias.

Air transport is the obvious solution for the communications problem in the Far North and West Centre. Goias, where conditions are better than on the Amazon, has only 240 miles of railway and 12,000 miles of indifferent roads in an area of 240,000 square miles. Navigation over the rivers is obstructed by falls and rapids, which necessitate frequent transhipments of passengers and cargo, and in many districts it is interrupted for all except shallow-draught boats in the dry season. Passenger and freight rates by air are practically the same as by river steamer, but journeys which occupy 10 to 20 days by water are made in two to seven hours by air.

Air transport charges in general were dangerously low in 1948—in many cases 75 per cent lower than before the war, although operation costs had increased considerably. There is still a good margin for increase of which the companies hesitate to avail themselves, fearing loss of traffic would result. The semi-official *Conjuntura Economica* pointed out in August 1950 that a C-46, transporting five tons of freight between Rio and Porto Alegre, makes the return flight in one day and costs 100 cruzeiros (£2), namely, the same as a four-ton lorry, which spends 12 days on the journey. Similarly, a passenger, flying by Constellation on the same route, pays 975 cruzeiros (£19 10s) and arrives at his destination in three hours. The train journey takes 70 hours and costs 500 cruzeiros, plus hotel, bed and meal charges. For medium-weight loads air transport is more economical in Brazil than any other system when incidental charges for insurance, etc., are taken into consideration.

The introduction of new rates and other economic safeguards was accompanied by a sharp overall increase in traffic, particularly in freight movements. The 1949 balance-sheets showed a slight improvement in the financial position of all but one carrier, who suffered heavy non-operational losses. Fifteen new routes were inaugurated during the year, placing Brazil second among the nations as regards length of inland lines. Compared with 1948, the distance flown by national carriers increased by 21 per cent, the number of hours by 12 per cent and passenger and cargo movements by 22 and 49 per cent respectively. The companies had 263 aircraft in service, 1,307 pilots, 1,090 mechanics and 631 wireless operators. The official list of airports shows seven prepared for DC-6 types and 94 for DC-3s, with 29 marine bases and 145 smaller airfields distributed throughout the country. National carriers operated two round flights weekly to Miami in 1949, four to Europe and the Middle East and seven to Argentina, Uruguay and Paraguay.

These international services were maintained without Government aid and entailed heavy losses, competing, as they did, with the subsidized services of eight well-equipped foreign enterprises. In 1950, however, the Brazilian Congress passed a law authorizing subventions at the rate of 10 cruzeiros (3s 9¾d) per kilometre flown between the last call on national territory and the terminal of the line. The immediate cost per annum was estimated at £1,074,000, but during the next 18 months new subsidized services were inaugurated to Beiruth, Santiago de Chile, Lima, Cochabamba in Bolivia, and Cayenne in French Guiana. In 1950, in addition to the international subsidies, the Treasury paid £250,000 in respect of inland routes.

Although subventions aided several carriers and traffic continued to increase, the overall financial situation remained unsatisfactory. The 1950 balance-sheets disclosed a combined deficit of £282,000 on the year's working and only one company distributed a dividend. Costs continued to increase, the traffic movement on several routes was unremunerative, while an excessive number of aircraft competed on others. Thus, six companies operated a total of 373 flights weekly between Rio de Janeiro and Sao Paulo in each direction. In order to curtail operational costs and combine services, several companies amalgamated or formed consortiums in 1951, thereby reducing the number of independent carriers from 21 to ten. Passenger and freight charges are now about to be adjusted, but the greater part of the increase may be absorbed by overdue salary adjustments.

In spite of present financial difficulties the prospects for Brazilian air transport in the future are excellent. The population is growing at the rate of one million annually, purchasing power is increasing, the range and volume of industrial production is expanding rapidly and agricultural, mining and manufacturing activities are being developed in hitherto neglected regions. These factors, combined with immense distances and topographical difficulties, seem to guarantee the future of air transport in Brazil.

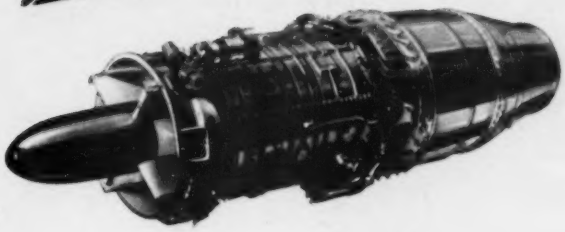
P.T.F.E.-INSULATED COILS

AMONG the exhibits of British Insulated Callender's Cables, Ltd., at the recent exhibition held in London by the Radio and Electronic Component Manufacturers' Association were examples of P.T.F.E. (Polytetrafluoroethylene) winding wire. By the use of this material, coils can be wound capable of continuous operation at temperatures ranging from 75 deg C to 250 deg C, and the maximum can be further increased for comparatively short periods of operation. The insulating film of P.T.F.E. is generally 0.001in thick.

From a production viewpoint the present stage of development of the material necessitates care in the winding of coils. Successful experimental windings are, however, being produced by the Royal Aircraft Establishment.

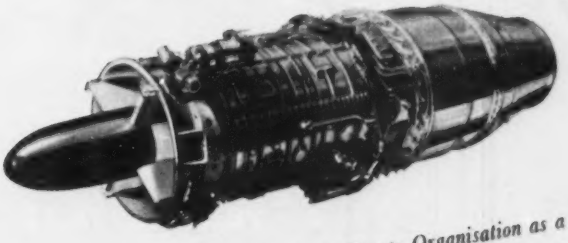
B.I.C.C. state that both production capacity and the raw materials required for manufacture are extremely limited and application must be confined at present to requirements having the support of the Ministry of Supply.

SAPPHIRE



THE ENGINE OF THE
NORTH ATLANTIC TREATY ORGANISATION

WRIGHT J/65



Adopted by the two principal members of the North Atlantic Treaty Organisation as a standard power unit for military aircraft, the Armstrong Siddeley Sapphire high-thrust turbojet (its U.S.A. version is known as the Wright J/65) will play a major part in freedom's defence.

ARMSTRONG SID

ARMSTRONG SIDDELEY MOTORS LIMITED
PARKSIDE, COVENTRY

Members of the Hawker Siddeley Group

PIONEER . . . AND WORLD LEADER IN AVIATION

These and other aircraft have the Martin-Baker Patent Ejection Seat.

- V.S. 508
- VENOM
- METEOR
- VALIANT
- AVRO 707
- WYVERN
- ATTACKER
- FIAT G.80
- HAWKER 1067
- GLOSTER G.A.5
- ARSENAL V.G.90
- BOULTON PAUL P.111
- MYSTERE M.D. 452
- AVRO C.F. 100
- FAIREY F.D.I.
- FOKKER S.14
- SEA HAWK
- CANBERRA
- OURAGAN
- D.H. 110
- PULQUI
- SWIFT
- S.A. 4.

Ejection Seats

MARTIN-BAKER
AIRCRAFT CO. LTD.

MARTIN-BAKER AIRCRAFT CO. LTD. GEORGE BERNARD, SD. GERRIDGE, HERTS.

Part Two, 1929-1952

By JOHN YOXALL

No. 201 SQUADRON R.A.F.

The History of a Famous Naval and Coastal Command Unit

THE resurgence of No. 201 Squadron in 1929 came about in this manner. In 1922 No. 230 Squadron with some F.5 boats was transferred from Felixstowe to Calshot and amalgamated with the Naval Co-operation Flight already stationed there. The new unit retained the designation of No. 230 Squadron and was commanded by S/L. W. B. Callaway.

Before the end of 1922 this combined unit was renamed No. 480 Flight and remained so for the next seven years before becoming the nucleus of No. 201 (Flying Boat) Squadron. It was equipped with metal-hulled Supermarine Southamptons. (The earlier Southamptons, as flown by No. 480 Flight, had wooden hulls.)

Every year in peace-time the annual training programme was carried out, with its cruises, affiliations and coast-defence exercises. Every morning the personnel were transported in the open trucks of the tiny light railway from the living quarters at Eaglehurst down to the slipways at Calshot Spit.

Here, with a Martello tower forming part of the office accommodation—a reminder of another threatened invasion of Britain—No. 201 coped with corrosion problems (there was no Alclad then) and taught a succession of young pilots the art of aerial seamanship.

In 1929 Calshot was very much off the map. If the writer's memory serves correctly, there was not even a bus service between there and Southampton. By arrangement, a special signal was flown from the Martello tower when the Isle of Wight boat was required to slow down while leave parties leapt aboard from a moving pinnace.

In the course of the next ten years, No. 201 changed its aircraft only once—from Supermarine Southamptons to Saro Londons—and it was with the Mark 2 London that the unit went to war for the second time, in 1939. It had, however, changed the "Flying Boat" in its official title and substituted "General Reconnaissance." There are now no longer any references in squadron badges to the rôle played by the unit. A point of interest in No. 201 Squadron's badge is that the emblazoned copy held by the squadron is one of the very few such badges autographed "Edward R.I."

At the outbreak of the war the squadron left Calshot and proceeded in six Saro Londons to their war station at Sullon Voe in the Shetlands.

In command was W/C. C. H. Cahill, A.F.C., who was also the C.O. of No. 100 Wing, of which No. 201 formed part. At the time when Britain's ultimatum to Germany expired, two Londons were on a patrol—F/L. Filson-Young piloting L7041 and F/L. Middleton with L7043.

Remote though it was, Sullom Voe soon felt the impact of war. On November 22nd, 1939, six German bombers raided the area, setting fire to London No. L7042, which was at its moorings. Another London was lost in the same month, when Middleton's aircraft, while on patrol along the Norwegian coast, developed a bad oil leak in the port engine. The captain put down successfully on a very rough sea and the crew were taken off nearly two hours later by the destroyer H.M.S. *Imperial*.

Three months later, in February 1940, it became the squadron's turn to do the rescuing. The crew of the S.S. *Sea Venture* had to abandon ship after being torpedoed and shelled by a U-boat. The arrival of a 201 Squadron London caused the submarine to submerge and the aircraft was able to direct the Lerwick lifeboat to pick up the survivors. In the same month a similar service was performed for the Danish ship *Chastine Maersk* by S/L. Findlay.

Whereas on land the "phoney war" lasted nearly a year, there was no such easy spell at sea, or in the air over the sea. Convoy and anti-submarine patrols were intensively flown and the first recognition of the squadron's work in face of the enemy came in April 1940, when W/C. Cahill was awarded the D.F.C.

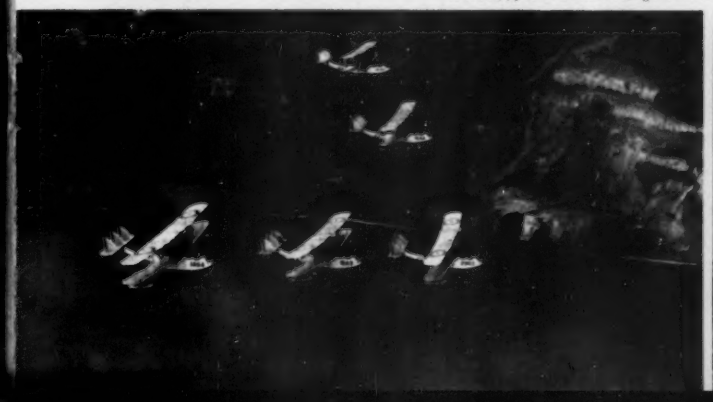
The squadron had now had their new Sunderlands for a month or so, and were temporarily at Invergordon, returning to Sullom Voe in June. Patrols went steadily on, but on October 29th the Sunderlands struck a bad patch. No. 18 Group gave orders for aircraft to search for a Sunderland of No. 204 Squadron, down on the sea some 200 miles N.N.W. of Cape Wrath. Weather conditions were exceptionally bad, with a southerly gale of 70 kt and a swell estimated at 60 to 70ft.

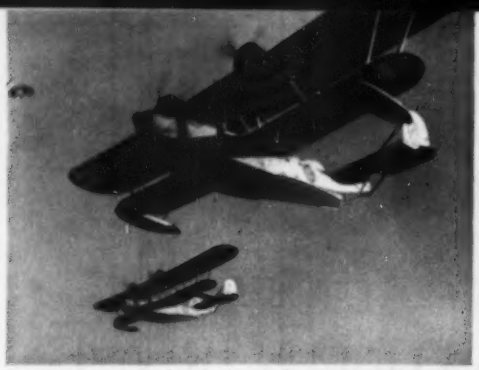
The search proved fruitless and at 1700 hr F/O. Field, in command of one of the Sunderlands, decided to make for Invergordon. Trouble started when the wireless went unserviceable but, by skilful navigation, a landfall on the Butt of Lewis was made an hour later. At this point the weather shut right in, and Field decided to climb to 6,000ft and set course for Invergordon. At his E.T.A. he descended to 2,000ft, only to find land and trees, dimly discernible through mist with the aid of his landing-light. The Sunderland was again taken up to the safe height of 6,000ft.

By now the wireless was working once more and a fix was obtained; it put the Sunderland 14 miles west of Wick! Meanwhile, the ground defences of what later turned out to be Scapa Flow opened up. The shooting, however, was not good and proved, in the circumstances, to be but a minor annoyance.

Plotting the fix, Field set course due east and, after flying for

(Left) A formation of No. 201's Supermarine Southamptons circumnavigating the Isle of Wight in 1934. (Right) Aircrews of No. 201 on Calshot beach in February, 1938. Left to right: Sgt. Easton, P/O. N. L. Smith, F/O. D. K. Banks, P/O. D. F. Spotswood, F/L. R. A. McMurtrie, F/S. Burdett, W/C. J. H. O. Jones (C.O.), P/O. A. C. R. Thomson, P/O. P. R. Woodward, P/O. H. J. A. Thewles, F/O. Bennett, Sgt. Briggs (rear) P/O. A. G. Wincott, P/O. C. S. Thomas, Sgt. Bannister. "Flight" photographs





Two of the squadron's Saro Londons in formation over Southampton Water in 1938. "Flight" photograph

town it was able to surprise a parade of German soldiers by a G.P. bomb. The ground defences were disconcertingly accurate—the first burst put both power-operated turrets out of action; another hit the tailplane.

The remaining bombs were dropped on a barracks, a motor convoy and a 6,000-ton ship, and at 1105 the Sunderland was headed for home. Despite an outside temperature of —20 deg C, weather conditions were good until 1645 hr, when a landfall was made on Muckle Flugga. Here, with approximately two-and-a-half-hours' fuel left, heavy snowstorms were encountered. Finding no way through or round them, S/L. Wright decided to try putting down on the sea near Woodwick.

A 12ft swell was running at the time, and the port wing-tip float hit a crest. The wing was submerged up to the port outer engine,

No. 201 SQUADRON R.A.F. . . .

20 minutes, decided to descend. At 800ft the landing light showed water (actually a lake) and a few seconds later there was a bump which brought some of the aircrew to their knees and shook off a depth charge.

Boost controls full rich, airscrews in fine pitch, throttles open against the stops . . . but still the Sunderland lost height—then, suddenly, the ground loomed up, giving the captain just time to pull back the stick before the inevitable crash.

The impact broke the Sunderland in two just aft of the trailing edge, the front part skating on for several hundred yards over the marshes. Of the crew of eleven, four lost their lives. The survivors spent the night under the wing with a gale raging about them, and Field walked four miles over the marsh to get help.

The same night "R" (F/O. Fleming), "E" (S/L. Cummins) and "Y" (F/L. Lindsay) were also despatched on this search. "E" force-landed near Thurso and "Y" got down safely at Sullom Voe; "R" was the only aircraft to get back to Invergordon.

Lindsay was soon to have another adventure on "Y." During November, while he was on patrol some 150 miles west of Oban, an enemy aircraft was sighted. On closer acquaintance it turned out to be an Fw 200. The two aircraft approached each other head on, turning away at the last moment. This manœuvre gave the Sunderland front gunner an opportunity to get in a burst; no reply came from the Fw. After the two big machines had circled several times in an elephantine sparring-match, during which the Sunderland's front and midships gunners got in another burst each, the Fw sheered off. Later, the Admiralty reported that an Fw 200 had been seen in the sea off the Dutch coast. In the light of this, and of the fact that no other engagement with an enemy aircraft of that type had been reported, it was assumed that "Y" was the cause of its loss.

The conditions under which the squadron operated at this time are shown in the account of the loss of "O," which was the squadron's first Sunderland to be equipped with long-range A.S.V. and Loran approach equipment. With S/L. Cecil Wright as captain, it departed on its eventful first operation—a reconnaissance of Narvik, Namsos and Trondheim. Starting from Sullom Voe at 0230 hr, the Sunderland made its first landfall at Trondheim at 0745. It then flew up the Norwegian coast to Narvik, which was reached at 1050 hr. On the approach to the

but after what seemed an age the flying-boat righted itself. The crew resigned themselves to a night on the ocean.

At 1930 the anchor was dropped, but held for only a few minutes. The engines had to be restarted and the flying-boat taxied into the lee of a cliff, where the anchor was dropped again. This process of restarting engines when the anchor dragged was repeated at least 30 times—and then the anchor broke. At 0430 hr, deciding to run the Sunderland aground, S/L. Wright taxied to a rock and made fast with the anchor chain. Shortly after, the aircraft swung round and went aground.

Meanwhile the lighthouse keeper at Muckle Flugga had seen the crew's distress signals and help came at dawn. Despite its battering the Sunderland was still in a fit state to be towed to Culli Voe, where minor repairs were made before a return was made to Sullom Voe.

A job which came the way of the squadron's pilots early in 1941 was the ferrying of Catalinas from America to Britain. Even this apparently dull job had its excitements. F/L. Fleming, D.F.C., on his first trip from Bermuda, had his automatic pilot jam at 18,000ft, putting the Catalina into a spin from which he was able to recover only 400ft above sea-level. Both ailerons were wrenched off and the Catalina completed the final 1,200 miles of its journey in six hours with no lateral control at all.

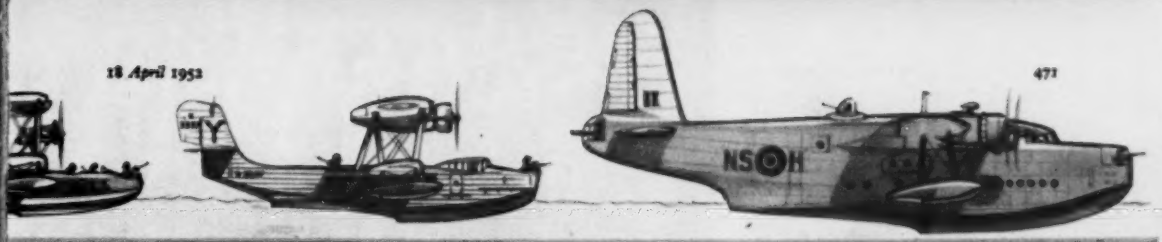
In March 1941, F/L. Alexander, flying "R," which rejoiced in the nickname of "Reilly Ffoull," tried conclusions with an Fw 200 and a Ju 88, both caught in the act of attacking S.S. *Staffordshire*. At the beginning of the action the Focke-Wulf was approaching at 1,000ft out of the sun about five miles distant from the Sunderland, which was at an altitude of only 100ft. The German made a dive attack on the ship's starboard bow, dropping four bombs—one or two of which were direct hits. While the enemy circled in one direction to renew the attack the Sunderland went the other way round in order to intercept. This it failed to do, owing to lack of sufficient speed, but in the second attack a near miss was the best the Fw 200 could manage. At this stage in the scrap the Ju 88 put in its appearance. The newcomer dropped a stick of four bombs, which fell short of the ship's port side; then, on his second run, he was intercepted by the *Sunderland*. He sheered off and was not seen again.

F/L. Alexander then turned up-sun to be in an advantageous

The rescue of F/L. Middleton and P/O. Lindsay and crew from the Saro London K.5912 by the destroyer H.M.S. "Imperial" in November, 1939.

(Right) W/C. C. H. Cahill, who was in command of the squadron at the outbreak of the Second World War.

(Below) "Battling Reilly Ffoull", the Sunderland which flew 1,100 hours between May 1940 and May 1941. At the end of the year five of the original crew were still aboard.



position should further attacks develop. Almost immediately the Fw was seen approaching head-on. It opened fire at 600 yd, but fortunately the shooting was bad and the shells went wide, as did those fired a few seconds later from the rearward-facing guns in the ventral gunner's position. The Sunderland used its front gun—the third burst from which was seen to hit the Focke-Wulf's nose—both midships guns, and the tail turret. The enemy disappeared into low cloud and was not seen again.

"R" scarcely deserved its uncomplimentary nickname, for in the 12 months from May 1940 to May 1941 it put in 1,100 flying hours—a performance which No. 201 Squadron claimed to be a record for any one aircraft in the Service.

The big excitement for the squadron in 1941 was the sighting and pursuit of the German battleship *Bismarck*. Returning from patrol on April 21st, F/L. Field, with P/O. Balfour and P/O. Day as his second and third pilots, reported seeing the battleship with its attendant cruiser *Prinz Eugen* at Narvik. To clear up any doubt as to the identity of the ships a further five aircraft were sent to investigate. By this time, however, the weather had clamped down in the north and they returned without success.

Three days later F/L. Vaughan and F/O. Evill in Sunderland "Z" ("Zacharish of the Long Whiskers"), while on search from Reykjavik, witnessed the action between the German force and H.M.S. *Hood* and *Prince of Wales*, in which the *Hood* was lost. After searching all night in conditions of nearly nil visibility they received a signal to intercept the naval forces then reported to be in action. They arrived just in time to see the climax. Observing one of the ships to be on fire and assuming it to be the *Bismarck*, they attempted to make contact with the successful side—only to be met with a hail of flak. They then realized what was happening. During the next few minutes the *Hood* received direct hits in the magazine and blew up with a tremendous explosion.

F/L. Vaughan remained in the vicinity of the German vessels, shadowing them and reporting changes of course until lack of fuel forced him to return to base. Soon after this episode F/O. Evill lost his life when "V," of which he became captain, was shot down while on patrol.

Although by far the major part of the squadron's work consisted of dreary long-range anti-submarine patrols, variety was always cropping up. On one occasion, Sunderland "O" was ordered to lead two Catalinas, with an escort of six Blenheim fighters, to a position 30 miles west of the Naze, in Southern Norway, to alight if possible and rescue the crew of the disabled Free French submarine *Rubis*. The flying-boats left Invergordon and met the Blenheims at Kinnaird Head. When the aircraft arrived over the prescribed area the submarine was not to be seen, and a square search had to be curtailed owing to the shorter range of the Blenheims. The *Rubis* was later found a long way south of the given position and towed into Dundee by naval vessels.

One day in September 1941, "O," the Sunderland which S/L. Wright had had to beach at Woodwick, was involved in another excitement off the east coast. F/L. Raban and P/O. Champion were given the job of taking the flying-boat, stripped of all guns, radio and intercom, down to Felixstowe. Off Flamborough Head it was challenged by an Me 110—and had only two tommy-guns on board against the enemy's two cannon and five machine-guns. Here we quote from the squadron diary: "With Raban at the controls pushing everything forward at once, old 'O' did 170 kt, while Champion acted as intercom by dashing back and forth with enemy-amplifying reports and fresh orders between the tommy-gun posts amidships and the bridge. The Me made one straight attack from astern without doing any damage and then broke off the engagement. Several of the crew claimed that they heard a sharp clattering aboard during the attack, but this was probably Raban putting on his tin hat!" "O" got safely through. The tommy-gun shooting must have been good!

By now No. 201, with Nos. 240 and 204 as companions, had been at Sullom Voe for over two years. It was therefore a relief to all concerned when orders came, on September 18th, 1941, for a move to Lough Erne in Northern Ireland. No. 204 had already gone to Iceland. A month after the move, No. 201 were visited by Air Commodore H.R.H. the Duke of Kent, who was killed a year later while flying from Scotland to Iceland to inspect the British forces there.

The officers were quartered in the Charter School at Kesh, where accommodation was primitive in the extreme. No light was laid on and one bath had to serve for between 40 and 50 officers—if and when water (fetched by lorry from Lough Erne) was available. Every morning there was a seven-mile journey down to Castle Archdale, where the moorings and squadron offices were situated.

Gradually, however, things improved. A mobile generator was obtained and the walls of the ante-room and dormitory decorated by appropriate paintings by "Rembrandt," the squadron artist. Ultimately, when the time came to go to a Nissen-hut camp nearer the moorings, all were sorry to leave.

In December 1941, F/L. Raban, flying "W," was detailed for a passenger-ferrying trip to Cairo—a pleasant change from endless patrols over arctic seas. The crew spent Christmas in Egypt and started the return flight on December 30th. Among passengers on board was A. V-M. H. P. Lloyd, then A.O.C. Malta and now Air Marshal Sir Hugh P. Lloyd, A.O.C.-in-C. Bomber Command. During the four days spent at Malta, "W" had a number of narrow escapes in the island's blitz, which was then at its zenith, but eventually got away "in a sky seemingly full of shrapnel, searchlights and Ju 88s."

During May, 1942, extensive operations were carried out. F/L. Powell took "V" down to Pembroke Dock and made long patrols to the south-west, and "Z" was taken up to Iceland to give protection to a Russia-bound convoy.

F/L. Field and P/O. Balfour, captain and second pilot of the Sunderland which first spotted the German battleship "Bismarck" at Narvik.

Sunderland "O" (F/O. Sandersen) on convoy patrol in 1942. The posts forming the "garden fence" are the early-type A.S.V. aerials.

As it appears in the squadron diary: "For heaven's sake stop tickling" is the inscription to this reflective study of a Sunderland.

At Castle Archdale, Northern Ireland: A group of aircrews of No. 201 Squadron in March, 1942. W/C. J. L. Crosbie, the commanding officer, is in the front row fourth from the left.

No. 201 SQUADRON R.A.F. . . .

On the last day of July, "P" was lost under particularly unfortunate circumstances. In poor visibility it was shot down by a straggler of the convoy it was protecting. One of the engines was set alight and, although F/O. Traill managed to put the aircraft down, it blew up on reaching the water. There was only one survivor. "R" was also lost while on patrol over the same convoy; it was seen to touch the water with a wing-tip during a turn.

The German air force called the Sunderland *stachelschwein* (porcupine), and respected it highly. That this was so was exemplified when F/L. Bunting on "S" made three sightings of Fw 200s in 1¼ hr. The first altered course, flew parallel to "S" and opened fire at 2,000 yd. When the Sunderland tried to close the Fw vanished into cloud. Ninety minutes later another (or the same) Fw 200 put in an appearance on the starboard bow, but would not close nearer than 750 yd until a third emerged on the port quarter. Bunting then wisely made for adjacent cloud-cover.

Though sightings of U-boats were generally few and far between, March 1943 was a good month for the flying-boats stationed at Lough Erne. In all, there were 11 sightings and seven attacks, and of these No. 201 had three sightings and three attacks. In all three of these the U-boats were assessed to have received damage.

Up to April 1943 the Sunderlands had been limited to sorties of 12 hr, but F/L. Hewitt of No. 201 worked out details of weight reduction in such a way that, with 2,500 gallons of fuel on board, endurance was stepped up to 15 hr, this leaving a safety margin of another three hours in case of diversion. To achieve this endurance the number of depth charges was cut by half, but a final arrangement allowed for a full load of depth charges, 2,250 gallons of fuel and an endurance of 14 hr. The longest range accomplished at that time was flown by "P" (F/O. Layne), who reached 30° 30' W.

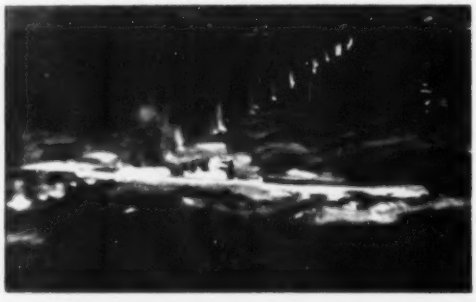
Christmas week, 1943, brought some welcome activity into what appeared to be a quiet month. Two of No. 201's flying-boats were able to play an important part in the destruction of a blockade-runner. "T" and "N" were detailed to search for the *Alsterufer* and then to "home" other aircraft and ships on to the target, but not to make a bombing attack without permission.

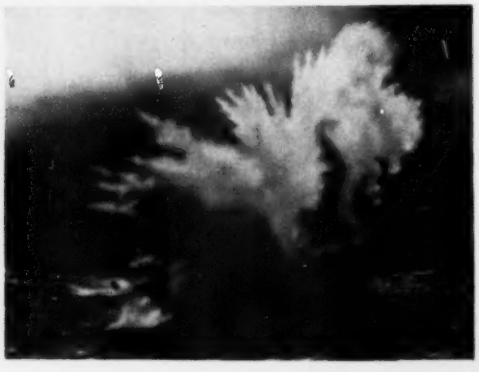
F/L. Baveystock in "T" found the vessel almost at the beginning of his patrol and started homing "N" and other aircraft from Nos. 422 and 423 Squadrons. He also asked permission to bomb, a request which was granted only after considerable delay. No hits were observed.

By now there were four Sunderlands on the scene, but not for long. "T" and one Sunderland from No. 423 were diverted to the Scillies. The Sunderland from No. 422 returned to base and "N" (F/L. Stack, the son of the late Capt. Neville Stack, the well-known demonstration pilot) was left to shadow the *Alsterufer* alone, receiving orders to wait and home a Liberator on to her. Stack had earlier jettisoned his bomb-load to increase endurance and, although instructed to fly to Foynes, he was able to make Castle Archdale with 108 gallons still in the tanks after having been airborne for 18 hr 35 min—a squadron record. The Liberator destroyed the ship with rockets.

For the part he played in finding the quarry, F/L. Baveystock was awarded an immediate D.F.C.

January 1944 brought a rumour of a move to Pembroke Dock. It turned out to be more than a rumour and an advance party was despatched; then orders cancelling the move came from Group.





Three phases during a successful attack on a U-Boat by F/O. Layne on June 27th, 1943. (Left) Bullet splash from the Sunderland's front guns as the attack opens. (Left, below) A depth-charge exploding over the submarine. (Below) A second depth charge catches the U-boat just as it makes its last dive. The tip of the U-boat's tail can just be seen.

The Bristol 173 Helicopter is fitted with two Alvis Leonides Engines

ALVIS

LEONIDES

ALVIS LIMITED, COVENTRY, ENGLAND

INSIDE **BEA** *No. 7 OF A SERIES*

First again Once again BEA make flying history. For they have operated the first and only regular scheduled passenger helicopter service in the world.

First tests and experiments It was in September, 1947, that BEA took delivery of their first helicopter. Then followed 18 months of intensive research—tests—research again; until in May, 1949, the first day mail service started from Peterborough to various East Anglian towns. Regular night mail flights were made throughout the following winter. And in June, 1950, the world's first passenger schedule came into operation between Cardiff and Liverpool.

First results This route was used as a "guinea pig." Passengers were asked to complete "Comment Cards" and, based on these, various changes were made. To gain wider experience (especially of operating a feeder service to busy airports), the service was switched in June, 1951, to operate between Northolt, London Airport and Birmingham. Now, another stage in the helicopter's development is due; and a scheduled freight service between Northolt and Elmdon will start in April. Meanwhile, experimental and development work on night and blind flying is being pressed forward.

First machines BEA uses three different types of helicopter. On passenger services Sikorsky machines—3 in all; each has a 450 h.p. radial engine and weighs about 2¼ tons. For training future pilots there are two Bell machines and one new Bristol 171 which has recently been lent to the unit for further experience. The Bells are powered by a 178 h.p. engine and weigh just under a ton. The Bristol, the latest type of helicopter in commission, has a 550 h.p. Alvis Leonides engine and weighs 2¼ tons. All BEA helicopters are, of course, fitted with radio.

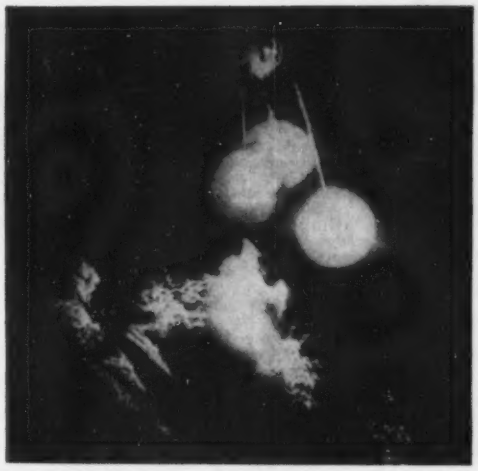
First thoughts . . . The Bristol 171 will eventually be superseded by the Bristol 173—a new 13-seater, 100 m.p.h. twin-rotor machine, which has already made its first test flight—most successfully. If all goes well, this type of machine will be carrying passengers and freight in regular scheduled flights by 1955.

And second thoughts on the future Within a decade or so the whole pattern of travel between cities and towns in Britain may well be changed by the helicopter. And this is a very exciting prospect indeed. In the middle of the 19th century the railways made London more than ever the pivotal centre of communication in Britain: by the end of the 20th century the helicopter may have altered all that; and revolutionized (in a dramatic way) the whole inter-city and cross-country network of communications in Britain.

BEA

BRITISH EUROPEAN AIRWAYS

The great freeze-up at Lough Erne in January, 1945.



A picture full of drama: The attack on a German submarine by F/L. L. H. Baveystock on the night of D-day, June 7th, 1944.

The affair became known in the squadron as "the great P.D. swindle," the only bright spots of which were the farewell parties held in the three messes.

In the way of business things were dull though, on February 16th, "W," captained by F/L. Longland, tried conclusions with a surfaced U-boat. A stick of six depth-charges was dropped, Nos. 4 and 5 straddling the submarine, which remained surfaced for a further 50 minutes but submerged before another aircraft could arrive.

The P.D. affair turned out to be not quite such a swindle after all, for early in March came a definite order to move to Pembroke Dock. The move was completed within a few days and operations were flown during the change-over.

The night of D-day—June 6th, 1944—brought another excite-

No. 201 SQUADRON R.A.F. . . .

ment. At 1942 hr on that day "S" left on an anti-submarine patrol and made a radar contact which led them to a swirl at 2355 hr. Just over two hours later, at 0244 hr, the same submarine was caught surfaced some three miles away from its previous position. Despite considerable flak, an attack was made with six depth charges, the straddle again occurring between Nos. 4 and 5. By the aid of flares an excellent night photograph of the U-boat was obtained. The attack earned three immediate awards. F/L. Baveystock was awarded a Bar to his D.F.C. and F/S. South and F/S. Currie both received the D.F.M.

Six days later, "S," this time under the command of S/L. W. D. B. Ruth, D.F.C. and Bar, failed to return from a patrol in the Bay of Biscay. It appears that the Sunderland fought it out with a U-boat; the enemy was sunk, but the flying-boat was itself shot down.

In July No. 201 was awarded a definite "kill" in a Coastal Command H.Q. assessment. "P" (F/L. I. F. B. Walters, D.F.C.) made a visual contact at 8½ miles' range. When the range had closed to three-quarters of a mile the U-boat started to dive, but the tail was still just visible as "P" passed over to drop five depth charges. Two fell to port and three to starboard, and both the man in the galley and the tail gunner saw the stern of the submarine momentarily lifted out of the water by the explosion. The Sunderland returned to the point of attack, but now there was nothing to see except pieces of wood and some froth. Later "G," in the same area, saw a bright red patch, 50 yards in diameter, on the surface.

It was in July, too, that the squadron had a change of commanding officer. W/C. R. E. G. Van der Kiste, D.S.O., whose going was much regretted, was posted to Group, his place being taken by W/C. Coates, who, as a junior officer, had served in No. 201.

The identification letters N.S. were allocated to the squadron and taken to mean "*Nulli Secundus*." A free translation by the C.O. was: "We won't be number three" (which they had previously thought they were—being the latest of three squadrons to be posted to Pembroke Dock).

Patrols in the Bay of Biscay were very fruitful, for the paths of U-boats coming and going from the Atlantic converged there. On August 11th, "B" (F/O. A. H. W. Mold) saw and attacked two together on the surface at night; it may well have been that one was refuelling the other. The first flares were dropped, and immediately red, green and yellow tracer came up from the two submarines, destroying the camera and flare-droppers. The flying-boat attacked from 40ft with six depth-charges, but since there was now neither camera nor flares it was impossible to assess any results.

A week later F/L. Baveystock got another submarine from a visual contact. He was off duty when the alarm went, but the story is best told in his own words as recorded in the squadron line-book: "When I got up on the bridge they said, 'Look, there's a periscope,' I looked and there *was* a periscope, so I just sat in the second pilot's seat and pressed the button. It was too easy." Apparently Coastal Command did not share his view, for he got an immediate award of the D.S.O. This was just one of 17 German submarines sunk between D-day and the end of July.

An entry in the squadron diary for this period, perhaps out of proportion to its importance, notes that the author of the present history, as *Flight's* war correspondent, went out with "M" on a 13-hr patrol. In October, too, it was the writer's privilege to attend the squadron's celebration of its 30th birthday. A number of guests had been invited, including Sir Arthur Longmore, but bad weather prevented their arrival.

All good things come to an end and November saw 201 back in Nissen huts at Castle Archdale and their area of operations changed from the Channel and south-western approaches back to the Atlantic convoys. Very soon there were a number of sightings. On the 9th "U" scored near misses, as did "Y" five days later. "S" had sightings on the 16th and 25th, while on a transit trip from Bowmore "W" made an unsuccessful attack.

December opened well with a definite kill by F/L. D. R. Hatton in "Y." The submarine was at schnorkel depth and the depth-charges, six in all, were all dead on track—three astern and the remainder ahead of the target. When flying "A" shortly afterwards, Hatton lost his life in a crash.

The new year, 1945, opened with a spell of intensely cold weather, and ice on the water and the hulls caused all operations to be cancelled. Conditions became so serious that the Sunderlands had to be beached; at one time there were 37 on the tarmac and slipway; they had to be defuelled and all depth-charges removed.

W/C. "Jasper" Coates, who had been with the squadron when it had Londons and Stranraers, gave up his appointment as commanding officer in March 1945 and his place was taken by W/C. J. Barrett.

Sightings were still fairly frequent; there were four in March and two in April. For the second April attack the squadron was awarded a "half." Naval Staff at Coastal Command H.Q. said that the object attacked was an "incipient waterspout"; the Air Staff considered that it was similar to a "schnorkelling" U-boat;

The German submarine, "Black Panther" which F/L. E. C. Arrighi on Sunderland "V" intercepted and escorted during its surrender.

No. 201 SQUADRON R.A.F. . . .

and the Admiralty Assessment Committee said "The U-boat is known sunk." Half was awarded to Sunderland H/201 and half to H.M.S. *Hesperus* and *Havelock*.

Sightings were made right up to the end of the war on May 8th, and it is interesting to record that in an attack by "B" on the 6th the submarine was assessed as slightly damaged; that this was confirmed later when the U-boat surrendered. On the day after V.E. Day "V" intercepted and escorted the surrendered submarine U.1105, *Black Panther*.

Even after the close of hostilities patrols had to be flown, and in some cases depth charges were dropped on what were thought to be submerged submarines.

On the 14th, "F" assisted in escorting eight surrendered U-boats and the last war patrol was flown on June 3rd by "Z", with the commanding officer, W/C. Barrett, as captain.

With their principal *raison d'être* ended, No. 201 turned to ferrying work—Bergen, Murmansk, Lisbon and Cairo all appear in the records. In a tremendous "Balbo" the Sunderlands flew in formation from Castle Archdale to Pembroke Dock to take up residence in South Wales once more. At the end of hostilities in the Far East there came the gradual whittling-down of the squadron by the posting and demobilization, a process which all units experienced.

A peace-time highlight for the squadron was the training and goodwill tour during July and August last year. Jamaica, Bermuda and Norfolk, Virginia, were all visited and stops made on the way at Reykjavik, Iceland, and Argentia, Newfoundland. The squadron embarked in four Sunderlands, with the commanding officer, S/L. Rumbold, in "E" and Lt. Cdr. Decker in "A," while "C" was flown by F/L. Simmonds and "W" by F/L. Ramsden. For the whole of the first leg to Iceland the aircraft kept in V.H.F. contact. Quite exceptional weather conditions were experienced: as the island was approached the Greenland ice-cap at Vatnajokull was sighted at over 100 miles' distance. This caused some rapid

Commanding Officers of No. 201 Squadron, 1929-1952

S/L. D. G. Donald	1-19-2
S/L. E. F. Turner	20-1-30
S/L. C. G. Wigglesworth	8-5-33
S/L. J. D. Breakey	1-4-35
W/C. J. H. O. Jones	20-9-37
W/C. C. H. Cahill	1-2-39
W/C. C. S. Riccard	18-8-40
W/C. W. G. Abrams	15-4-41
W/C. J. L. Crosbie	23-12-41
W/C. J. B. Burnett	19-8-42
W/C. R. E. G. Van der Kiste	4-5-43
W/C. K. R. Costes	15-7-44
W/C. J. Barrett	22-2-45
W/C. J. W. Louw	26-8-45
W/C. W. H. Tremear	21-3-46
W/C. J. L. Crosbie	5-5-47
S/L. D. H. F. Horner	1-9-47
S/L. R. C. L. Parkhouse	27-1-49
S/L. H. A. S. Disney	7-2-50
S/L. P. A. S. Rumbold	4-12-50

Goodwill visit. Two of the four No. 201 Squadron Sunderlands at Kingston, Jamaica, during the American tour in 1951.

figure-checking to be performed by the navigators concerned.

The four boats left in daylight at 0200 hr on July 14th for Newfoundland and found bad weather for part of the way. At one time the captains of "W" and "C" thought that head-winds would cause them to run out of fuel, but conditions improved and a landfall made after 15 hours' flying. Engine trouble delayed "E" at Argentia, but eventually all four aircraft arrived together in formation over Kingston, Jamaica, on July 17th.

During the four days which the crews spent on the island the residents took much trouble to entertain them, and the same thing happened when, on July 21st, they arrived in Bermuda. With W/C. Brookes, a member of the British Joint Services Mission in Washington, who had joined the flight as liaison officer, S/L. Rumbold, paid official calls on the Governor and Service commanders, both American and British.

A co-operation exercise with the Americans was staged on the 24th and the aircrews were interchanged, the Americans flying in the Short Sunderlands and the British in Martin Mariners.

At a parade on July 27th, the squadron was presented with a plaque depicting Bermuda's armorial bearings, a gift from the people to the unit. On the same day the flying-boats left for the American naval base at Norfolk, Virginia, being escorted by four Mariners for the last part of the journey.

In order that anti-submarine exercises might be carried out with the American Navy, the programme was extended for a further three days, but on Friday, August 3rd, the Sunderlands left for Argentia in perfect weather, passing Atlantic City, New York, Nantucket and Nova Scotia. A hurricane warning caused a delay of a few hours, but all the flying-boats were airborne by 2100 hr on the following Monday. Iceland was reached by 0730 the next morning and, after a quick refuel, the boats took off for the last leg at 1300. By 2015 all four Sunderlands were once more safely waterborne at Pembroke Dock.

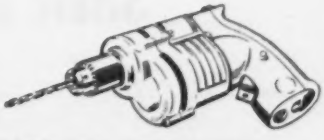
The future of No. 201 Squadron is the subject of much speculation by members of the unit. Good as they are, the obsolete Sunderlands must eventually be replaced. Will all these highly trained "aerial seamen" be given landplanes to fly? Only time can tell.

No. 201 Squadron in 1952. The officers in the front row are: F/O. B. C. Day (Adjutant), F/O. E. W. Willey, F/O. N. Allin, F/L. D. S. Dickins, S/L. P. A. S. Rumbold (Commanding Officer), F/L. J. R. Ramsden A.F.C. (Flight Commander), F/L. J. Webster, F/L. P. Gill, F/O D. J. Perry.

A comparison of 'output'

Many months of investigation, with visits (all paid all weighed) to and from the United States of Ameriky have produced startling conclusions on comparative output per worker in the two countries. It turns out that the British Worker, *per se, ipso facto,* and *nulli secundus,* is in no way inferior to his American counterpart. He marries less frequently, sees the sea more often ("But it must be remembered" says the Report* "that the United Kingdom is an island") drinks less Coca Cola and uses different cuss words. But he has the same number and kind of hands and his brain ticks in similar fashion to the American Thinking Box. "We have reached the conclusion," says the Report* perhaps a little obviously "that all that is necessary to raise British productivity is the provision of more and more and more and more Desoutter Power Tools."

* *This report was specially written by a Committee of Desoutter's Little Horses with the Managing Director as its amiable Chairman. The report was unanimous.*



Desoutter

POWER TOOLS INCREASE PRODUCTION

DESOUTTER BROS. LTD., THE HYDE, HENDON, LONDON, N.W.9. · TELEPHONE: COLINDALE 6346 (5 LINES) · TELEGRAMS: DESPNUCO, HYDE, LONDON

CBC 830

Do you know your airfields?

21

Recognise this airfield? It's No. 21 in this series of puzzle photographs. You'll find the answer below on the right. ★

Sooner or later, someone always mentions Shell and BP when there's talk about aircraft service. Small wonder! Everyone in aviation knows how efficient, how reliable are the crews of the Shell and BP Aircraft Servicing Vehicles—on duty at twenty-five of Britain's biggest civil aerodromes.

Shell and BP Aviation Service

Shell-Mex and B.P. Ltd., Shell-Mex House, Strand, London, W.C.2.
Distributors in the U.K. for the Shell
and Anglo-Iranian Oil Groups.

★ *Elmdon, Birmingham.*

CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

"Angels One Five"

WHILE agreeing with most of the comments of your correspondents on the film *Angels One Five*, I feel that I must contradict Mr. Alex Thorne on a few points :—

First : "Angels one five" *does* mean 15,000ft.

Second : Squadrons *did* scramble in formation on very many occasions, especially on the forward aerodromes.

Third : Enemy aircraft *have* been shot down by a stern diving attack (I have done it myself !).

Nevertheless, I must agree that, with all the trouble taken with the film, so very little more would have been necessary to get it exactly right.

Peckleton, Leicester. DONALD A. S. MCKAY.

ALTHOUGH I have not yet seen the film *Angels One Five* myself, I was interested to read the two critical letters about it in *Flight* of April 4th, especially so after most reports of it were favourable. (G/C. Douglas Bader has described it as authentic—but, then, who is he to say so : after all, he only took part in the Battle of Britain !) I quite agree with the points raised in the first letter, but not all those in Mr. Thorne's, and I should like a say on some of the "examples" given, using the writer's own numbering :—

(2) Living near Croydon aerodrome, I can well remember at least one squadron of Hurricanes which used to take off in formations of six during those hectic days of 1940.

(4) Although I don't know what age the station commander is supposed to be, I would, without wishing to offend Mr. Hawkins (the actor concerned), picture him as fortyish. This age would have given him a chance to have served in the 1914-18 war and so to have some of those medals which Mr. Thorne begrudges him.

(5) According to Sir Hugh Dowding's despatch on the Battle of Britain "angels one five" would mean 15,000ft when the action of the film is supposed to take place in July and early August. Later it was changed and would then mean 18,000ft.

(6) Several published photos from pilots' camera-gun film would seem to disprove the first part of this sweeping statement.

South Croydon, Surrey. T. HARDING.

Ex-B.O.A.C. Solents

SEVERAL statements in the letter signed "Hydravion" and published in the issue of *Flight* dated March 28th were quite incorrect. Here are the facts :—

Of 18 Solent flying-boats which were constructed for B.O.A.C., 17 were returned to Belfast (one having been written off); until sold, they remain the property of the Ministry of Civil Aviation.

So far (April 5th), six have been sold and delivered. One has gone to Aquila Airways, four to Trans-Oceanic Airways (one of these was written off at Malta) and one to Tasman Empire Airways. A number are at present held under option by prospective purchasers and only two are immediately available for sale.

At no time were any of these aircraft taken over by International Aircraft Sales or any sales organization other than that of Short Brothers and Harland, Ltd.

C. G. HOLLOWELL,
Belfast. Short Brothers and Harland, Ltd.

In Touch by Air

PART I of Mr. James Hay Stevens's exposition (*Flight*, April 4th) of the state of the aircraft industry in Canada is satisfying reading; but it fails to bring out the enormous possibilities of Canada for British emigrants, and the plight which faces the Canadians if emigration is not on a fuller scale. On a recent visit to Canada (B.O.A.C. stratocruiser, Montreal-London, 10 hr 4 min) I made a minor research that produced interesting figures. In the period 1945-50 the total number of immigrants was 379,199. Of these, 173,090 were of British stock. Of the balance of 206,109, only 3,404 were of French stock, despite the French-Canadian draw in Quebec Province.

In the same period no fewer than 158,300 Canadians left Canada, mainly for the higher-salary zone of U.S.A. Hence, the balance of British stock to Canada was only 14,790, or an average of only 3,000 a year to a country more than 3,000 miles wide !

Canada is yelling for development, and the opportunities for artisans are unlimited. The thing that baffles most people is why the slum dwellers of Britain's industrial north do not respond when the Golden West offers them a way of life immeasurably beyond their present state. In some regard, the herd instinct and a slum complex pervades; and the family ties are strong bonds. No less in attraction are the English habits of hob-nobbing in pubs, watching football matches, and participating in certain native sports practised across the glorious countryside that so often surrounds the towns of the satanic mills.

But there is evidence of a deep-rooted belief that emigration means severance, a cutting-off from all the past and all these ties and attractions. That was the case even 20 years ago; indeed, it is often forgotten that the Atlantic had only experimental services from 1937 to 1940; the real passenger mastery of the Atlantic dates from 1945.

The significance of this is overlooked by those habitually using air travel, and the need for a propaganda drive on a slogan such as "Emigrate, And Still Be In Touch By Air" is needed. As soon as the idea sinks in "up North" that it is quicker to fly from Manchester to Montreal than journey from Manchester to, say, Cornwall or Kirkwall, the sooner Canada will benefit.

London, W.1. B. J. HURREN.

Ultra-light Turbojets

RECENT references to the lack of suitable power units for ultra-light aircraft lead to the reflection that no one has yet mentioned the use of a turbojet or turboprop, probably because these types are not yet sufficiently well developed; but a glance at a few figures shows that they hold great promise for the future.

In December, 1950, Boeing announced that by 1952 their 502 turboprop should have a take-off power of 254 h.p. with a maximum continuous rating of 140 h.p. at 20,000ft. It weighs 185 lb for a size of 38in by 23in by 18½in, has only one-sixth the number of parts of an equivalent piston engine, can be completely dismantled and reassembled in six hours by only one man, and should be cheaper to produce than a piston engine.

The Boeing 500 turbojet, from which the 502 was developed, gave 180 lb thrust for a weight of 111 lb, for the same dimensions. The French Piméné gives 220 lb thrust at take-off, 176 lb continuous rating, weighs 139 lb, with a diameter of 16in and is 43in long. At present its fuel consumption is about three times that of a piston engine, but it is claimed that development of the ducted fan can halve this. Since the price of paraffin is only about half that of petrol, if consumption of the jet is reduced as claimed (although it will need more fuel—one and a half times) the cost will be less (only three-quarters); and since the weight of the turbojet is less than that of the piston engine, for the normal range of the light aircraft the extra fuel, allowing for the fact that paraffin is lighter than petrol, should weigh no more than that saved by the use of the lighter turbojet engine.

The present snag comes with the price; it is over £1,000. Against this, one has run for over 1,000 hr without overhaul, and the designer claims 5,000 hr will be possible in the fully developed engine. It is the amount of development in progress that makes the price so high, and if Boeings' prophecy is correct, it will go below that of the piston engine. Boeing have other small engines under development, among which may be some suitable for our ultra-lights, since both the Boeing units and Piméné give rather more thrust than we need. The greatest gain of these engines is perhaps in their very slight vibration, which renders an aircraft easier to design and make, as also does the lack of torque.

Cambridge. PEDANTICA.

FORTHCOMING EVENTS

Apr.
21-24. S.A.E. Aeronautic Meeting, New York.
Apr. 22. R.Ae.S. Graduates' and Students' Section: "Servomechanisms," by F. H. Borlase, B.Sc. (Eng.), Grad.R.Ae.S.
Apr.
22-24. R.A.F. Golfing Society: Spring Meeting, Walton Heath.
Apr. 24. R.Ae.S.: "Fuel Systems for Turbine-driven Aircraft," by J. E. Walker, A.F.R.Ae.S. (at Luton).
May 3. Vintage Aeroplane Club: Rally, White Waltham.
May
3-11. F.A.I.: Committee Meetings, Madrid.
May 5. I.A.T.A.: Fifth Annual Technical Conference, Copenhagen.
May
5-16. British Industries Fair.
May 10. Exeter Aero Club: Display.
May
10-11. l'Association des Amis de l'Aumoneries de l'Air: Rally.
May 17. Wolverhampton Aero Club: Goodyear Trophy Race and Display.
May 21. Aircraft Recognition Society: Contest, London.
May 22. Aero-Club du Dauphiné: Air Meeting, Grenoble.
May 22. Aéro-Club de France: Coupe Stamm (helicopters).
May
24-25. Ragosine-Auster Trophy Navigation Competition, Rearsby.
May. 29. R.Ae.S.: Fortieth Wilbur Wright Memorial Lecture: "Prophecy and Achievement in Aeronautics," by Sir Harry M. Garner, C.B., M.A., F.R.Ae.S.

WHAT AILS PRIVATE FLYING?

The "Ultra-light" Cure Discounted

By VANNIUS

IS a belief in the ultimate revival of British private and club flying merely wishful thinking, or is the patient already beyond hope? Though the author of this outspoken article has left himself vulnerable on points of detail we believe his main arguments to be worthy of serious examination.

BRITISH private flying is at the lowest ebb in its history. Experts, professional and amateur, are waving aloft banners bearing the slogans which they think will bring salvation to the movement, and of these the two most favoured are "Government subsidies!" and "More ultra-lights!"

The pros and cons of the first cure have been well aired on several previous occasions; of the second, except from the technical angle, less has been said. It is the present author's intention to face certain basic facts which are usually ignored or, at the best, glossed over.

A very vocal section of opinion seems to regard the ultra-light aircraft as a *deus ex machina* which in some miraculous way is going to resurrect private flying from its grave. If the reader is shocked by the implication that private flying is already dead, let him consider the few flying clubs which still manage to preserve the appearance of prosperity—bolstered up in a living death by dances, socials and the billiards table in the clubhouse, and with a membership consisting of a mere handful of flying members surrounded by socialites. This sort of thing, if we are to believe the ultra-light advocates, can be magically transformed into a busy hive of little aircraft flitting in all directions, piloted by the hundreds—nay, thousands—of potential flyers who have only been waiting for the ultra-light to arrive and make all their dreams come true.

But the blight which has stricken the flying clubs is not to be cured by any such panacea as a mass-produced simple aircraft.

Let us examine the causes of the ailment and then see how far—if at all—the ultra-light could help to bring about an improvement. In general, the decline of private flying can be attributed to two shortages—lack of enthusiasm and lack of money.

There are those who bravely maintain that the enthusiasm is still there but that suitable aircraft are lacking. This is nonsense. Flying clubs all over the country have aircraft standing idle for lack of patronage. It would be better to face up to the fact that there is very little enthusiasm of the kind which prompts young men of limited means to sacrifice their cigarettes and cinema visits so that they can afford flying lessons. The few who are willing to make the sacrifice can (and do) still succeed. That they do so proves that it is possible for the real enthusiast to fly, even under today's conditions. That so few actually do make the effort proves that there just is not the active interest in flying which is the first essential of a thriving private-flying movement.

Swings and Roundabouts

Every summer, at flying displays up and down the country, the public form up in queues for joy-rides. This fact is enlarged upon by the flying enthusiasts to "prove" that the majority of the public are only too eager to fly if given the opportunity. This is as great a fallacy as drawing a similar conclusion from the queues for the roundabouts at a fair. If two million people a year patronise the roundabouts at travelling fairs, it does not follow that they are willing to make a journey once a week to the nearest public park to enjoy themselves on the swings; even less does it follow that they want to buy roundabouts of their own. The public are not even willing to travel to the nearest airfield for joy-flights between rallies, let alone for flying lessons. This is instanced by one rally last year, when there were joy-ride queues from mid-day to dusk; yet in the preceding 12 months not a single person had enquired about joy-flights, despite an advertising campaign in the local Press by a charter firm specializing in that line of business. The weekend after the rally one party came along for a trip; and that was the total of the public's enormous enthusiasm for flying.

The point is that most people are not interested in flying for flying's sake any more than they are keen on driving for driving's sake. The man who learns to drive does so because he intends to buy a car of his own, not so that he can hire one from a local garage and spend his weekends driving round the block. When the motor car was first invented, everyone wanted to drive for the sheer pleasure of driving, regardless of whether he could afford one or not; but now the motor car has lost its thrill of novelty and has become a useful means of conveyance. The only reason for learning to drive is so that this means of conveyance shall be available to the driver. There are still some well-to-do enthusiasts who like to drive solely for the pleasure of it and these are to be found every year heading across Europe for Monte Carlo, just as a few similarly placed flying enthusiasts migrate to the Continental rallies every summer. Private flying will never be popular with the general public until the aeroplane at least partly replaces the motor car as a means of conveyance—in other words, not for a good many years.

The basic difficulty is that private flying is a luxury, and an expensive luxury too. Admitting, therefore, that in some cases enthusiasm is curbed by shortage of money, it is possible that cheaper flying will attract some genuine enthusiasts who are unable to afford the present £3 an hour. How much, then, can the ultra-light aircraft contribute towards cheaper flying?

Bearing in mind that to own an aircraft for pleasure flying is far beyond the means of most people, it is obvious that no ultra-light is going to be so cheap that it will sell in thousands. There may be hundreds of thousands of business men each willing to spend £500 on a car which will be useful to him on every day of the week; but there are very few who would spend the same amount on an aircraft for business or pleasure. The proof lies in the "Aircraft for Sale" columns of the aeronautical Press. How can an ultra-light be produced for less than a secondhand Autocrat, for example? The answer is, of course, that it cannot; and therefore, if a secondhand aircraft will not sell for £500, who is going to buy an ultra-light which will be inferior in many items of comfort and equipment? Moreover, although the simple ultra-light will be cheaper than a *new* full-size aircraft, both to buy and possibly to maintain, it will still be hampered by the same storage costs, C. of A. renewals, insurance, landing fees and all the other unavoidable expenses which strangle private flying. In other words, the ultra-light can do little to reduce the cost of private flying.

As for the design and construction of ultra-light aircraft, certain features stand out very clearly. The demand will be so small that mass-production will be out of the question and the design must be for a simple aircraft that can be constructed in a garage if need be. Designs of this type have been in existence for years, yet there are remarkably few of them in the air. In other words, the amateurs have not been successful in their attempts to produce a popular ultra-light, while no aircraft firm will be interested until there are much healthier signs of a market. Add to this the current impossibility of obtaining a suitable engine and it becomes obvious that even if there were any place in private flying for this type of aircraft, it is very unlikely that it would get built.

The flying clubs must realize that flying never was, and is not now, a popular pastime as far as the general public is concerned. It is a luxury which only the wealthy can afford, and under present conditions the wealthy are very much in a minority. This is the reason for the slump in private-flying activities. No new types of aircraft, ultra-light or otherwise, are going to rescue the flying clubs or private flying as a whole from this situation.

HUNTINGS TO SURVEY CEYLON

THE Government of Ceylon has awarded an aerial survey contract to Hunting Aerosurveys, Ltd., for aerial photography in connection with the development of the island's resources.

This contract is a practical outcome of the technical assistance provided by the Colombo Plan. The work will include photography of several areas of the island, and will assist the Forestry, Irrigation and Town Planning Departments in the development of their plans. Some of the photographs will later be used for preparing accurate contoured maps.

The expedition which is leaving the United Kingdom for Ceylon to carry out the work is equipped with a Percival Survey Prince. Capt. F. C. Brown is the expedition manager and Mr. H. F. Lewis is in charge of photography.

Another recent Hunting contract is with the Burmese Government, which, as part of the plan for developing its country's national economy, has invited the company to carry out an aerial survey and prepare contoured maps of several reservoir and hydro-electric sites.

This contract is an example of the advantage of the aerial survey technique in a country where access on the ground is difficult. The photography is being carried out by the Hunting Aerosurveys expedition which has just completed a further contract for the aerial mapping organization of the Government of Thailand, and which has proceeded from Bangkok to Rangoon for the purpose.

The pilot and expedition manager is Capt. L. C. Sharling, who has carried out many aerial survey expeditions overseas. During the war he operated over Burma as a pilot in Transport Command.

MARATHON

New NAVIGATIONAL TRAINER

for the

ROYAL AIR FORCE

Also for airline service with

U.B.A. and W.A.A.C.

HANDLEY PAGE

RADLETT LONDON READING

APPROVED

CELLON

"142"

(ONE-FOR-TWO)

PRE-TREATMENT PRIMER

☆

A **ONE** SOLUTION ETCH PRIMER WITH
THE **TWO** SOLUTION "BITE"...

CAN-LIFE: **ONE YEAR PLUS**

NO MIXING OR WASTE

CELLON "142" PRIMER IS A.I.D. APPROVED TO SPECIFICATION D.T.D. 900 APPROVAL No. R.D. MAT. 4225 FOR USE UNDER SPECIFICATION Nos. D.T.D. 63B, 260B, 314A, 754, 772 and 796

Trial quantities and full details supplied on request

CELLON LIMITED · KINGSTON-ON-THAMES · SURREY

Telephone: Kingston 1234 (7 lines) Telegrams: AJAWB, Phone, Kingston-on-Thames

A CRANFIELD EVENING

The College of Aeronautics Senior Common Room Society Entertains

THE Senior Common Room Society of the College of Aeronautics entertained a number of distinguished guests at their recent annual dinner—the fourth to be held at Cranfield.

Of the speeches, it can be said that they fully met the standard set by the three previous dinners at Cranfield—than which, perhaps, no higher praise can be given. Proposing the toasts of "The College," Mr. A. T. Lennox-Boyd, M.P. for Mid-Bedfordshire, said that he was very glad to have the college in his constituency; not only did it enliven the neighbourhood but it enabled him to renew many of the friendships which he made when he was Under-Secretary in the Ministry of Aircraft Production. Mr. Lennox-Boyd made several allusions to the days of "the great coalition" and paid tribute to his former superior, Sir Stafford Cripps, who had taken the primary Ministerial responsibility for the establishment of the college; but his speech was by no means sentimental, for it established a hearty basis of good humour which remained throughout the evening.

Replying to the toast, Air Marshal Sir Victor Goddard, the Principal, expressed surprise at the opinion—which some people entertained—that the college was inaccessible. Was not Cranfield in the centre of Bedfordshire, which was itself in the very heart of England—which was, equally, the centre of the whole land-mass of the world? But perhaps, said Sir Victor, the college was a bit off the beaten track. The establishment could most easily be reached by air, and the excellent aerodrome was being, and had been, used by aircraft other than those belonging to the college. In particular, British European Airways had carried out much research flying with aircraft based at Cranfield, and Sir Victor invited other bodies to do the same.

The Principal then spoke of the traditions upon which any academic institution, to be successful, must be founded. Behind him as he spoke was a protrait of Sir George Cayley, the accepted "father of British aeronautcs"; this was almost the only tangible evidence of tradition possessed by the college, and he hoped that his words would not go unheeded.

A somewhat annoying feature of the present time, continued Sir Victor, was the liability of young men for National Service. He felt that a man in the aircraft industry, or one undertaking research in a Government department, could serve his country just as well as he could in the armed Services. It was to be hoped that National Service would not always imply service in the Forces, especially for graduates of Cranfield.

Professor A. R. Collar then proposed the toast of "The Society," and he asked his audience what he should talk about. Aeronautics? No, that was right out. That left only two interesting topics and, "putting one aside for the moment," he was left with the subject of beer, which he employed as the *leitmotif* of the remainder of his speech.

Responding, W/C. C. G. B. McClure, chairman of the Common Room Society, summarized the events of the past year. Nineteen-fifty-one had been a year of sound development at Cranfield, while staff changes had not been numerous. He welcomed Air Marshal Goddard, Mr. E. F. Relf, the previous Principal, having retired since the last annual dinner was held. Professor Lickley had left to become chief engineer of Faireys, while Dr. Robinson had taken a post in Canada. W/C. McClure welcomed Professor Ward to the chair of mathematics and, among other newcomers to the faculty, Mr. Spillman to the department of design; he was especially glad of the latter appointment, because Mr. Spillman was the first Cranfield student to have joined the teaching staff. Professor Young then came to "my *non sequitur*—the funny story." "*Non Sequitur*" worried someone, to whom the chairman retorted, "I am a classical scholar you know, even though I am at Cranfield." His story was not classical, but is likely to become a classic.

The toast of "The Guests" was left in the capable hands of Mr. J. D. North, a member of the board of governors of the college. After he had provided his listeners with a dictionary definition of the word "governor," Mr. North proceeded to his consideration of the 62 guests. He had some delightful things to say about each group, who by this time were warming to the appreciation of his steady flow of wit.

The reply was made by Major G. P. Bulman, Director of Construction and Research Facilities, Ministry of Supply, who struck the only serious note of the evening. He referred to the original committee of four who had first discussed the establishment of the college; and he spoke of the work that was now being done there. With aircraft and weapons becoming so complex, he said, there was a danger to be guarded against—the danger of man losing his soul. He reminded the assembly to preserve a sense of proportion and not to become slaves to machines. So, with a rather sombre coda, closed another memorable Cranfield gathering.

MR. LINKLATER FALLS SHORT

"Our Men in Korea," 80 pp., 2s 6d; and "The Campaign in Italy," 480 pp., 12s 6d. Both written by Eric Linklater and published by Her Majesty's Stationery Office.

THESE two books have much in common. Both are "popular" histories, officially sponsored, and both concern themselves almost entirely with land operations. But there is one important difference. Whereas *Our Men in Korea* portrays well the magnificent courage and fighting ability of British troops under conditions of great hardship, *The Campaign in Italy* slogs on as wearily and unglamorously as the struggle which it describes.

Mr. Linklater explains that infantry must always receive the major part of an historian's attention because "whether by gaining ground or losing it, they show the changing front of battle and, in their fortunes, conveniently record the progress and disappointments of a campaign." Nevertheless, one can only deplore the impression he gives that Allied air forces in Sicily and Italy, on the few occasions when they were not grounded by bad weather, spent their time bombing our own soldiers, or dropping paratroops in the wrong place.

The Korean story is better, perhaps because Mr. Linklater saw Naval Aviation in action, and actually flew to the battle zone in the back seat of one of H.M.S. *Glory's* Fireflies. He mentions, all too briefly, the achievements of Sea Furies and Fireflies from *Triumph*, *Theseus* and *Glory*, Sunderlands of the Far East Air Force Flying-Boat Wing, Mustangs of the Royal Australian and South African Air Forces, and the British, Australian and Canadian Transport squadrons; and there are excellent photographs of all these among the 45 illustrations. But the fact that his story is concerned only with Commonwealth forces, precluding details of U.S.A.F. air operations, gives an overall false impression that air power has played little part in the campaign; and there is no excuse for calling a Sea Fury "a Firefly" in one of the pictures.

JOHN JAY IDE HONOURED

AMONG recipients of awards at the recent Washington meeting of the National Advisory Committee for Aeronautics, was Mr. John Jay Ide. He was honoured by the presentation of a special gold medal and a scroll in recognition of his services as European representative of the N.A.C.A. for the past 23 years.

Mr. Ide began his work in Europe when he was assigned to the American Embassy in Paris in 1921. On leave from the N.A.C.A. during World War II, he served in the U.S. Navy, first in the Bureau of Aeronautics in Washington and later on the staff of the Commander of the U.S. Naval Forces in Europe and as Assistant Naval Attaché for Air at the American Embassy in London. After the war he returned to civilian life with the rank of captain, U.S.N.R.

In addition to his work for the N.A.C.A., Mr. Ide has represented the Department of State at numerous international aeronautical conferences. Since 1922 he has been an American delegate of the Fédération Aéronautique Internationale and is a former vice-president; he is at present chairman of the Commission Sportive Internationale of the F.A.I.

CANADA'S GROWING POTENTIAL

A FORTNIGHT ago, in the first of his articles on Canada's aircraft industry, James Hay Stevens listed a number of firms building aircraft and components under contract. This week (pages 462-464) he reviews the work of many additional companies, and now comes a news-item from Montreal which reports that a $2½ million contract for tail assemblies—presumably for the T-33—has been awarded by Canadair, Ltd., to Enamel and Heating Products, Ltd., of Amherst, Nova Scotia. The plant, in which training aircraft were built during the war, is expected to be in production with the new order in about five months' time.

FROM THE CLUBS

ON Sunday, April 6th, the London Aeroplane Club staged its first dawn patrol of the season beneath heavy skies and with the promise of gales approaching from the south-west. The weather obviously acted as a deterrent to many would-be attackers and as we approached Panshanger only one solitary defender—an L.A.C. Tiger Moth—was in sight, with no trace of the breakfast-hunters. However, within a few minutes the sky gave evidence of a group of hungry pilots from White Waltham and another from Denham; a small contingent had arrived from Herts and Essex; Southend was well represented, and by 0930 hr some 15 machines were firmly chocked and picketed outside the club house.

We ourselves were unfortunately unable to escape the eagle-eye of that lone Tiger Moth's pilot, but nevertheless watched enviously as the five lucky pilots were each refunded their "prize money." Those who successfully penetrated the defences were: Mr. Varcoe from White Waltham, in Messenger G-AKKG; Mr. Cooper, also from White Waltham (Fairey Flying Club) in Magister G-AKUA; G-AIGE, an Autocrat from Southend, with the airport manager, Mr. Collins, at the controls; Dr. James, who battled his way against 35 m.p.h. head-winds from Southend in the diminutive Chilton; and, another brave attacker, G-ALMA, Mr. Hayward's Piper Cub from Broxbourne, flown by Mr. Roberts.

On emerging from the R.A.F.V.R. Mess, having enjoyed a first-rate breakfast, the visitors were greeted by the promised gale, visibility of less than a mile and a cloud base of 200-300 ft. A few of the more intrepid aviators decided to crawl home between the hills—though some returned within minutes—but the majority remained convinced that the warm fire and comfortable armchairs of the club lounge were called for, and with little prospect of the weather clearing before midday the chance of an impromptu lunch patrol being held seemed probable. And so it turned out.

THE Southend Flying School, whose financial year ended on March 31st, logged a total of 1,827 hr flying during that period on its fleet of three Austers augmented by a Dart Kitten and a Proctor. The flying time for March amounted to over 97 hr. Since the beginning of the year three members have been awarded their P.P.Ls. and some 24 pupils are now under instruction, including three who are studying for their Commercial Pilots' Licences.

With the new approach talk-down system, and equipment for night-flying—two of the three Austers are fitted with radio and one with two-stage amber—the S.F.C. is logging a considerable number of instrument-flying hours and approach training. Incidentally, Southend are eager to hear of any other flying school or club, with night-flying facilities, who would be interested in co-operating in nocturnal cross-country flights. Any such organization would necessarily have to be within, say, 30 or 40 miles from Southend.

Mr. S. G. Smith, until recently the school's C.F.I., has now taken up a similar post at Plymouth and in his place Southend is shortly to welcome a Mr. Wales from Australia; Mr. Collins, the airport manager, is meanwhile carrying on as C.F.I.

The dawn patrol at Panshanger, mention of which is made above, was supported by the S.F.C. in strength, and in addition to the entire club fleet two privately owned machines also arrived. Three Austers from Southend, incidentally, all made use of their radio on the return journey.

As is the case with other flying clubs situated with easy access to Customs clearance, the S.F.C. is planning to organize Continental cross-country flights for its pupils during the coming season; this may be considerably cheaper in the long run than local cross-countries, in addition to which the pupil will receive the navigational and other benefits obtainable from flying abroad. A similar programme is also being planned by Mr. Cotter, whose "Penguin Squadron" flying school now operates from Gatwick.

FOLLOWING the agreement given by the M.C.A. to representations initiated by the Association of British Aero Clubs and Centres in 1950, to the effect that the F.A.I. Aviators' Certificate should no longer be a pre-requisite for the issue of a Private Pilot's Licence, two further concessions have now been obtained, one in connection with the validation of pilots' licences issued by countries which are members of I.C.A.O. and the other concerning the requirement for a photograph to be affixed to the P.P.L.

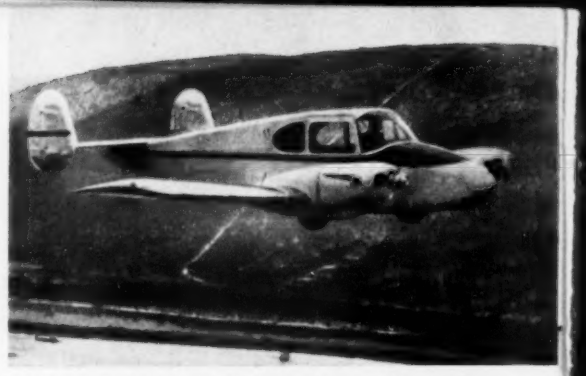
An extension until the end of 1952 has been granted in connection with the suspension of the requirement for validation of Licences imposed by Article 21 of the A.N.O., 1949, and the A.B.A.C. draws attention to a statement which it issued last April: "In giving the concession, the M.C.A. has been influenced by the understanding that normally certain checks are imposed by the clubs on visiting pilots and that the following practice would be adopted by the clubs as a standard and long-standing practice: (1) The club ensures that the visiting pilot has a valid licence (issued by a country that is a member of I.C.A.O.). (2) The visiting pilot is required to demonstrate to a club instructor by a flight of approximately 15 minutes' duration his competence to handle an aircraft of the type he desires to fly. (3) The visiting pilot is required to satisfy a club instructor that he is familiar with the Air Traffic Regulations of the U.K. and the Flying Control Rules at the aerodrome on the routes to be flown."

The A.B.A.C. hopes that, provided clubs take all necessary precautions to ensure that pilots with foreign licences operate to a satisfactory standard of safety, the M.C.A. will at the end of the current year make permanent this waiver of the requirement for validation.

An amendment to the requirement for a photograph to be affixed to the P.P.L. is shortly to be issued by the M.C.A.

With the redundancy of the Aviator's Certificate so far as the P.P.L. is concerned, the abolition of the photograph and the extension of the waiver of validation of Pilots' Licences issued abroad, the A.B.A.C. (which initiated the negotiations with the M.C.A. for all three concessions) can claim to have taken yet another step towards simplifying and cheapening private flying.

DURING March the Strathtay Aero Club's flying time amounted to 74 hr 50 min, bringing the total since January 1st to 271 hr 30 min. Weather during these three months has been particularly bad in the Strathtay area, but, nevertheless, the S.A.C. has managed to keep pace with the flying times of its Southern contemporaries—in fact, it can claim to have exceeded the totals of many of them. On Sunday, March 30th, heavy snowstorms in the Forth area prevented members of the club from attacking Macmerry Aerodrome, where a tea patrol was being held.



NEW U.S. TWIN: The Piper Twin-Stinson, mention of which was made in "Flight" recently, is now on flight-test for production next year. Powered by two 135 h.p. Lycomings, this four-seater has a cruising speed of 150 m.p.h., range of 720 miles and estimated cost of £8,900.

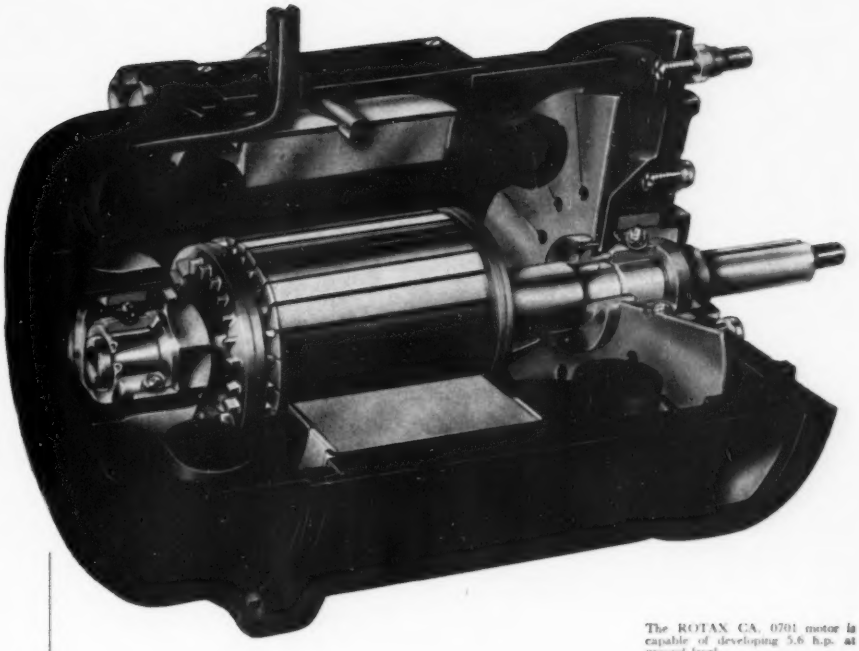
AIR-RACE NEWS

ENTRY forms for both the Speed and Transport Handicap Sections of the England-New Zealand Air Race, to be flown in October, 1953, have now been issued by the Royal Aero Club. Entries must be received by January 31st, 1953.

Forms are now available, also, for the National Air Races and the Goodyear Trophy Race.

In connection with the National Races, the Secretary-General of the Royal Aero Club has announced that provisional reservation has been made for a number of rooms at the County Hotel, Newcastle-upon-Tyne, 1, for those competitors desiring accommodation, and that a list of other hotels is available on request. The County Hotel will be the headquarters of the Royal Aero Club officials, and transport for competitors will be arranged from this hotel to and from the airport on Thursday, Friday and Saturday, July 10th, 11th and 12th. Completed entry forms for the National Air Races must reach the Royal Aero Club not later than May 19th.

The Goodyear Trophy Air Race, to be held at Wolverhampton Airport on May 17th, will be the first of the eight nominated air races which are eligible for the British Annual Air Racing Championship. Entry forms for this contest are available from Mr. L. E. T. Barley at the Wolverhampton Aero Club, and the closing date for entries is April 30th. The number of entries for this race will be limited and application should therefore be made as early as possible.



The ROTAX CA. 0701 motor is capable of developing 5.6 h.p. at ground level.

• AN AUXILIARY MOTOR *for the Handley Page HERMES 4*

Rotax have in the past developed a range of 400 cycle motors, but the motor illustrated above is designed to operate over a lower frequency range of 240-280 cycles to meet the special requirements of the Hermes 4 generating system. The motor's application is controlled by a Rotax Frequency Sensitive Unit.

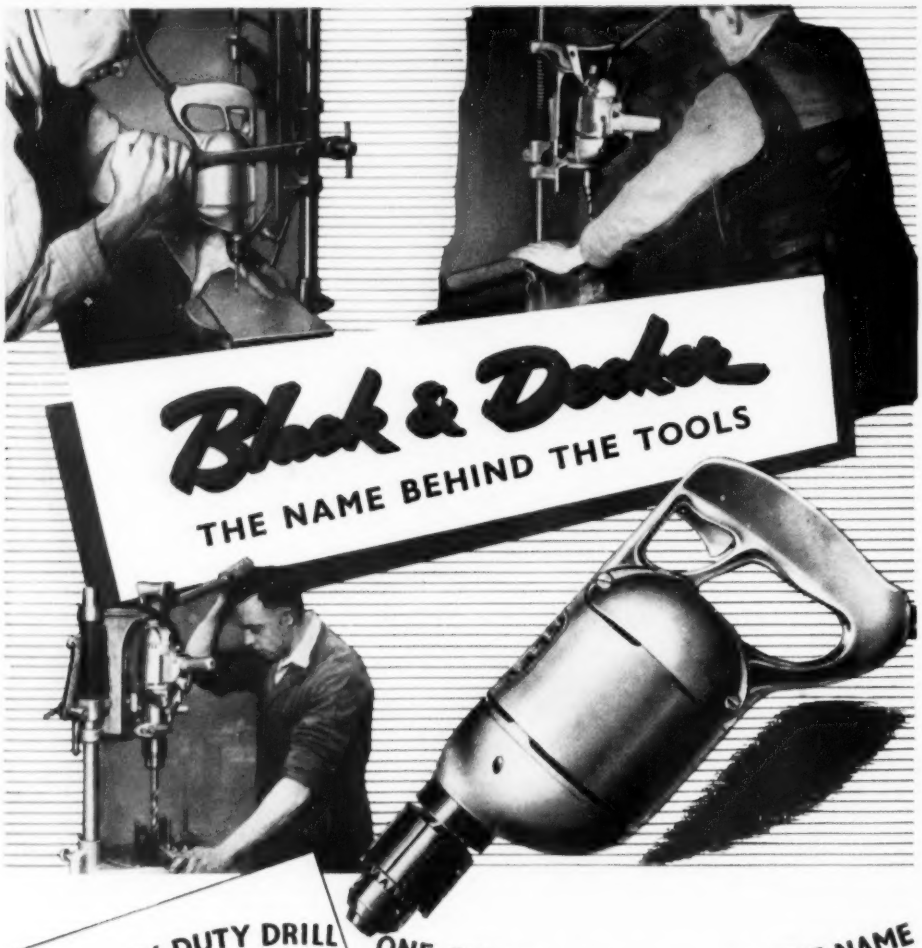
These motors operating from a 3-phase, 110 volt supply have the double advantage of saving cable weight and of providing the robust construction associated with induction motors.

At all times, our engineers are available to advise on the application of electric motors in aircraft.

Complete Electrical Systems for Aircraft

ROTAX

ROTAX LIMITED, WILLESDEN JUNCTION, LONDON, N.W.10, ENGLAND.
LUCAS-ROTAX LTD., TORONTO 13, CANADA.
LUCAS-ROTAX (AUSTRALIA) PTY. LTD., 81 BOUVERIE STREET, MELBOURNE, N.3 AUSTRALIA.



¼" HEAVY DUTY DRILL

B & D Drills are made in 15 types and sizes, capacities ¼ to 1" in steel (double in hardwood)

Leading Distributors everywhere sell Black & Decker PORTABLE ELECTRIC GRINDERS SANDERS · VITRIFIERS · DRILLS ETC. VALVE RECONDITIONING EQUIPMENT AND BENCH GRINDERS

ONE OF THE TOOLS BEHIND THE NAME

How much use do you expect from a portable electric drill? Black & Decker promise plenty —for every drill they make can be assembled with a B & D Bench Stand to form a Drill Press. Gives added leverage, accuracy and freedom of manipulation. Permits close-limit and repetition work. So note the name — Black & Decker, the tool with extra earning power, and the stamina to undertake the extra work!

The first choice of craftsmen the world over

BLACK & DECKER LTD. HARMONDSWORTH, MIDDX. PHONE: WEST DRAYTON 2681/7
LONDON · BIRMINGHAM · BRISTOL · GLASGOW · LEEDS · MANCHESTER · NEWCASTLE · NOTTINGHAM
Smee's

"Flight" photograph

L.A.P. LANDSCAPE: Three Hermes IVs of B.O.A.C. appear in the foreground of this scene at London Airport. Beyond them are an R.C.A.F. Canadair, a Viking and Elizabethan of B.E.A., a K.L.M. Convair 240 and an Air France Languedoc.

CIVIL AVIATION

NEW ROUTE FOR QANTAS

DUE to be inaugurated early in July, the Qantas trans-oceanic service linking Sydney and Johannesburg is as yet unnamed, but may possibly be called either Albatross or Capricorn. Three days will be taken for the 8,500-mile flight, which will be *via* Perth, Western Australia, the Cocos-Keeling Islands, Mauritius and Johannesburg. Constellation 749As will be used, and the initial frequency will be one service a fortnight.

The airline surveyed this route with a Lancastrian as far back as 1948, but, due to the extent of the middle leg—a 2,700-mile hop across the Indian Ocean from the Cocos to Mauritius—its commercial possibilities have only emerged with the advance of long-ranged aircraft of greater capacity. Another factor which has hastened this Southern Hemisphere project has been the taking over of the Cocos Islands, with their war-time airstrip on West Island, by the Australian Government. About £750,000 is being spent on renovating and extending the strip to 8,000 yards. It is of crushed coral, capable of supporting the heaviest type of aircraft, and new radio navigational aids are being installed.

Capt. Russell B. Tapp, line manager of Qantas, who recently flew to Cape Town to arrange the facilities for the new service, made periodic trips during the war from Perth, Australia, to Ceylon in Qantas Catalinas which generally did the 3,531 miles in one hop. He stated in Johannesburg that Qantas was flying regularly from Perth to the Cocos, mostly with food supplies for the islanders. The next survey flight with a Constellation would be made in the second half of May.

The Constellations used on the fortnightly scheduled flights would carry 34 passengers, and would be fitted with specially large mail-freight compartments, for the commercial trading aspect would be emphasized. To avoid the necessity of carrying slip crews, there would be a one-day stop-over at Port Louis, Mauritius, on the westbound route.

Although Capt. Tapp did not dwell on the strategical possibilities of the new route, South African sources have suggested that it could easily be extended in the event of war—should the Middle-East-India routes become neutralized or "difficult"—to maintain traffic between the United Kingdom and Australia.

At present air travellers between South Africa and Australia take from seven to nine days, dependent upon chance dovetailing of the respective air services—Air India International to Karachi and Bombay, South African Airways and B.O.A.C. to Cairo and North Africa, and B.O.A.C and Qantas to Australia.

SCHEDULED OR NON-SCHEDULED?

BECAUSE of the difficulties in differentiating between scheduled and non-scheduled international air services, a definition has been prepared for the guidance of 57 member-nations of I.C.A.O. and was adopted by the Council at the beginning of this month. Broadly speaking, a single aircraft can fly into or across I.C.A.O. members' territory without receiving prior permission, and under certain conditions can carry revenue traffic. On the other hand, a scheduled international service must have special permission or other authorization from the government of each country it flies into or across.

According to the new definition, a scheduled international air service is a series of flights that possesses all the following characteristics: (a) it passes through the air space over the territory of more than one state; (b) it is performed by aircraft for the transport of passengers, mail or cargo for remuneration, in such a manner that each flight is open to use by members of the public; and (c) it is operated, so as to serve traffic between the same two or more points, either (i) according to a published time-table, or (ii) with flights so regular or frequent that they constitute a recognizably systematic series.

C.A.B. REVIEW FLYING RIGHTS

THE flying rights of two principal American operators have been under examination by the Civil Aeronautics Board for renewal and extension. The Board's chief examiner, Mr. Francis Brown, has recommended that renewals should be made without major changes in the present routes. It is mainly the transatlantic rights which are under review, those granted in 1945 being due to expire on July 4th next. Pan American Airways' licence to serve Shannon and Lisbon, being a permanent one, is not concerned.

With the exception of certain five-year agreements which he proposed, Mr. Brown said that the rights of Pan American World Airways and Trans World Airways should be made permanent. Among the exceptions were T.W.A. services to London, Frankfurt and a new proposal for the Azores, and P.A.W.A. services to Rome, Paris, and a proposal for Casablanca (between Lisbon and Dakar).

It may be recalled that when President Truman approved Pan American's purchase of A.O.A. in 1950 he directed that P.A.W.A. should compete with T.W.A. at London, Frankfurt, Paris and Rome.

Rejections recommended to the Board by Mr. Brown included a T.W.A. proposal (that P.A.W.A. be excluded from Paris and Rome) and an application from European - American Airlines for transatlantic cargo routes. T.W.A. wish to extend their services from India to Japan in order to link up with North-West Airlines and so form a new round-the-world flight, but the Board has been advised to defer action on this request for the time being.

TIP-TANKED CONNIE: In anticipation of eventual conversion to turboprop-power, and consequently increased fuel consumption, Lockheed have designed tip-tanks for the Super-Constellation. Shown fitted to the prototype, the tanks increase the aircraft's fuel capacity by a total of 1,200 (U.S.) gallons.

CIVIL AVIATION . . .

HELICOPTER PLANS IN JAPAN

SIX companies have applied to the Japanese Civil Aeronautics Agency for permission to operate helicopters on mail, light freight, communications and sight-seeing work, and some of them have already completed negotiations for the purchase of machines abroad. The companies concerned are the Daiwa Touring Airlines Co., who plan to operate eight aircraft, said to include Westland-Sikorskys; Nippon Helicopter Transportation Co., seven aircraft including Bells; Toho Helicopter Transportation Co., four Bells; Nishi Nippon Helicopter Co., two Sikorsky S.51s; and Joso Chikuba Railway Co., one Bell 47D. The sixth applicant is the Nippon Touring Airlines Co.

Nihon Kikai Boeki Kaisha (the Japan Machinery Trading Company), who hold a sales agency for Bell helicopters, are reported to be negotiating an agreement with Bell Aircraft Corporation for the rights to assemble these aircraft. When the Japanese Peace Treaty comes into force the Ministry of International Trade and Industry is expected to authorize the manufacture of helicopters.

Foreign-exchange allotments for purchase of aircraft abroad have usually been made on a quarterly basis, and $110,000 has been added to the allotment for the months January to March. It is understood that more money is to be made available for the purchase of helicopters by news agencies and similar concerns during April. In anticipation of the ratification of the Peace Treaty, Mainichi Newspapers are reported to have arranged for the delivery of a Cessna, a Piper Cub and a Bell 47D to facilitate news coverage.

Details of several current and impending Japanese airline services were given in *Flight* of April 4th.

T.C.A. STRETCH THEIR NORTH STARS

AS reported in *Flight* on April 4th, Trans-Canada Air Lines are adding to their fleet of Canadair Four *North Star Skyliners*, bringing the total in service to 23. The three extra aircraft, which have now been delivered, will not entirely solve T.C.A.'s problems, and the 17 domestic-route Canadairs are to be converted to accommodate 48 passengers instead of 40. The Canadian Department of Transport has issued a certificate of airworthiness for the aircraft with this increased passenger-capacity.

T.C.A. feel that since the North Star was designed as a long-range aircraft capable of transatlantic operation, advantage should be taken of its load-carrying ability to increase the capacity on the shorter Canadian domestic routes. The modification involves the rearrangement of toilet and rest-room facilities, so that the fitting of extra passenger-seats will not reduce comfort.

When the five Super-Constellations are delivered next year, the transatlantic North Stars will be released for domestic operation.

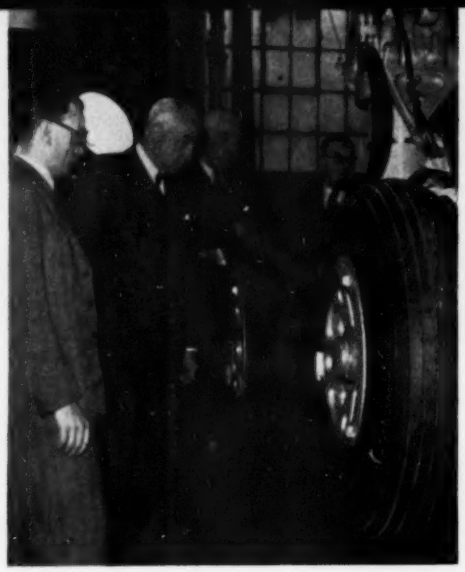
AN ORIENTAL PROFIT

YET another company has been able to report a profit on its 1951 operations. This time it is Philippine Air Lines, who have had their most successful year with an operating profit of 2,257,990 pesos (about £403,212) and a net profit of 2,891,758 pesos (about £516,385).

The net profit represents 9.3 per cent of the total revenue. In 1951, revenue ton-miles increased by 15 per cent to a total of 19,180,043, of which 63.9 per cent was produced by international services. Combined international and inter-island passenger miles flown were 130,258,016. Cargo ton-miles achieved were 5,101,801 and mail ton-miles were 514,600. Perhaps the most satisfactory aspect of the company's 1951 operations was the achievement of an 81.71 per cent overall load-factor.

The company's fleet, consisting of DC-6s on trunk routes and DC-3s on local services, flew 41,178 hours—representing 6,232,113 miles—and the DC-6s achieved 8 hr 40 min utilization per day. During the year P.A.L. sold their last DC-4; the airline will take delivery of two DC-6Bs this year, and four Convair CV-340s in 1953.

Philippine Air Lines' trunk routes stretch from Manila west to London and east across the Pacific to San Francisco. In addition, there are routes from Manila to Hongkong and Tokyo, and an extensive inter-island system radiating from Manila.



PLENTY TO SEE: A recent visitor to Filton was the chairman of B.O.A.C., Sir Miles Thomas, who toured the B.O.A.C. maintenance base and the aircraft and engine divisions of the Bristol Aeroplane Company. He is seen inspecting the "functional mock-up" of the Bristol 175 with (left to right) Messrs. Daniel, C. F. Uwins and F. J. Chard.

BREVITIES

JERSEY AIRLINES are now operating a daily Rapide service from Jersey and/or Guernsey to Plymouth *via* Exeter. The service was inaugurated on April 7th, when the Bailiff of Jersey and other dignitaries flew to Exeter for a civic reception.

* * *

A.V-M. R. P. Willcock, C.B., R.A.F. ret., Civil Aviation Adviser to the U.K. High Commissioner in Australia, has changed his office address to 489, Bourke Street, Melbourne, Australia.

* * *

Now in America to inspect helicopters on behalf of Aer Lingus is Mr. J. O'Leary, a director of the airline. Another director of Aer Lingus engaged on a similar mission is Lord Douglas of Kirtleside, whose visit is, of course, being made in his better-known capacity as chairman of B.E.A.

* * *

The Sikorsky S-55 has been awarded a certificate of airworthiness, making it immediately available for commercial use; among the first users, it is reported, will be Los Angeles Airways and the Oakanagen Air Service in Vancouver. Since last April, this type of helicopter has flown 11,000 hours in Korea. It is being manufactured under licence in Britain by Westland Aircraft, Ltd.

* * *

The general enthusiasm for helicopters found in every branch of B.E.A. is particularly marked in Scotland, where the inter-island ambulance and mail services are thought to offer great possibilities for rotating-wing aircraft. Mr. Robert McKean, B.E.A.'s Scottish manager, thinks there are also many openings for helicopters on internal services and has already named St. Enoch Square, Glasgow, and Waverley Station, Edinburgh (which has a flat roof), as potential "air-stops."

* * *

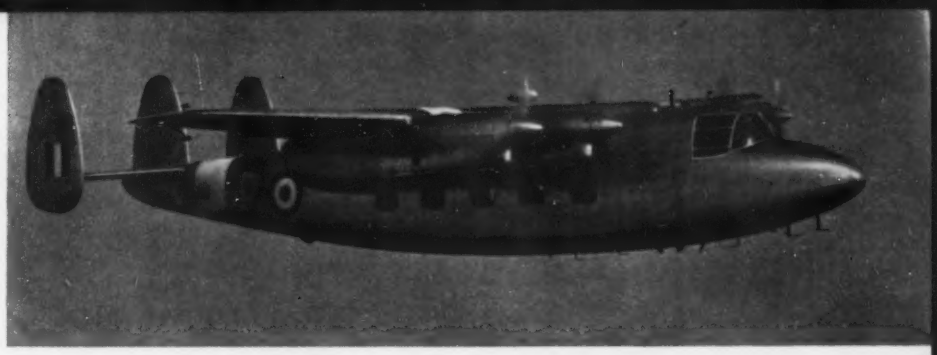
The public enclosures at London and Northolt airports, which opened for the Easter holiday on April 10th, will remain open daily from 11 a.m. to dusk until October 12th. As in previous years, the enclosures will have refreshments and attractions for children, and there will be running commentaries and facilities for tours and pleasure flights.

* * *

Despite the reduced overseas travel allowance, B.E.A.'s Easter schedules showed a record increase over normal traffic. On the Paris, Nice and Jersey services, B.E.A. operated 104 extra services during the seven-day period ending on Easter Sunday, compared with 94 on the normal schedule. Elizabethans flew 18 extra London-Paris services; the number of passengers carried on this route was 3,500.

* * *

I.C.A.O. is to assist the Government of Indonesia in forming and operating a national aviation college near Djakarta, which will train Indonesians as air and ground crews to operate airline services. Work has already begun and a disused airport built during the Japanese occupation is being put back into service. An assistant director and nine instructors will be supplied to the college, and the strength of the I.C.A.O. technical assistance mission, operating since July, 1951, is to be increased from eight to 12.



LATEST OF A LONG RACE: As reported on an earlier page, 30 Handley Page Marathons have been ordered for the R.A.F. for use as navigation trainers. The first of them is seen here in its Service colours.

SERVICE AVIATION

Royal Air Force and Naval Aviation News

Air Marshal Stevens in U.S.A.

THE A.O.C.-in-C. Coastal Command, Air Marshal Sir Alick Stevens, who is also Allied Air C-in-C. Channel Command, N.A.T.O., left St. Eval on April 9th to fly to the United States. He made the journey in a Shackleton of his own Command.

On April 10th he was present at the establishment of the headquarters of Admiral McCormick, the Supreme Allied Commander, Atlantic, at Norfolk, Virginia.

Appointment Change

THE Air Ministry has announced that from May next, A.V-M. Sir Harry Broadhurst, K.B.E., C.B., D.S.O., D.F.C., A.F.C., will be Assistant Chief of the Air Staff (Operations). It had previously been announced that A.V-M. L. F. Pendred, C.B., M.B.E., D.F.C., would take up this appointment, but now he will stay in his present post as Commandant of the School of Land/Air Warfare at Old Sarum.

Naval Appointments

THE Admiralty announces the following appointments: Capt. A. G. S. Evans, B.Sc.(Eng.), R.N. (Instructor Captain), to be Command Instructor Officer on the staff of the Flag Officer Air (Home); Capt. W. J. W. Woods, D.S.O., R.N., to H.M.S. *Indomitable*, in command and as Flag Captain to the C-in-C. Home Fleet; Capt. R. R. S. Pennefather, R.N., to H.M.S. *Unicorn*, in command.

Korean Awards

THE following are additions to the list published last week:—

AIR FORCE CROSS

S/L. J. E. Gerber, R.A.A.F.—As commanding officer of a communication unit, S/L. Gerber has flown a total of 540 hours on transport aircraft in support of operations in Korea. Much of this total has entailed flying for long periods, frequently under adverse and arduous circumstances. Before graduating as a pilot S/L. Gerber had flown 1,085 hours as a navigator and has now flown a total of 2,590 as a pilot.

DISTINGUISHED FLYING MEDAL

F/S. J. H. Taylor, R.A.F., has completed forty operational flights, involving 400 flying hours as First Signaller in Sunderland aircraft. His high degree of skill as a wireless and radar operator, has made a great contribution to the success of his squadron. In particular, his competence on the radar equipment has been invaluable when aircraft have been called upon to operate in extremely bad weather conditions.

Sgt. J. W. Hutchings.—During the last twelve months this N.C.O. of the King's Royal Rifle Corps has carried out extensive operational flights involving 730 flying hours over the jungles of Malaya and in Korea.

SOON FOR KOREA: Fairey Fireflies from H.M.S. "Ocean" make their last flight over the Mediterranean before the carrier leaves Malta to relieve H.M.S. "Glory" in Korean waters.

F/S. Meggs and F/S. Bessell—both of the Royal Australian Air Force—have been flying Mustangs and Meteors with No. 77 Squadron, R.A.A.F. F/S. Meggs has a total of 100 operational flights to his credit and F/S. Bessell has flown 90.

MENTIONED IN DESPATCHES

The following R.A.F., Army and R.A.A.F. personnel have been Mentioned in Despatches in connection with air operations.

F/Lts. J. Poyser, E. L. Roberts, and G. P. Welsh. F/Os. D. N. Galpin and P. B. Rea. F/Sgts. K. W. Burlton, W. L. Fraser, and J. H. Tolman. Sgts. L. L. C. Andreetti, G. H. Bruce, E. Fozard and D. G. Kinch. Cpl. Tech. P. O. Parr. All of the R.A.F.

Capt. A. G. E. Stewart-Cox and L/Bdr. C. K. G. Nash, both of the Royal Regt. of Artillery.

The names mentioned from the Royal Australian Air Force are: Sgt. P. A. Allen. Cpls. K. C. Jones and G. J. Whitbread. L. A/Cs. E. A. Ambrose, R. R. Beggs, J. F. Brady, L. Cronin, K. A. Einam, G. G. Kerr and R. A. Philbrook.

R.A.F. Gifts to Greeks

TRAVELLING by mule, Sir Charles Peake, the British Ambassador to Greece, with Lady Peake, recently visited the two Greek villages—Aidonchori and Molivdoskepaston—which have been adopted by the R.A.F. They distributed to the villagers gifts which included sheep, goats, beehives and clothing. These gifts were made available as a result of an appeal launched last year by Sir John and Lady Slessor., More than 500 bales of clothing and £4,000 were subscribed.

The two villages were totally destroyed during the war as a reprisal for the harbouring of British Servicemen.

R.A.F. Assist R.Cey.A.F.

THE Royal Ceylon Air Force, the youngest of the Commonwealth Air Forces, at present consists of a cadre of eight officers and 100 airmen. It is commanded by G/C. G. C. Bladon, R.A.F., who is assisted by a team of R.A.F. specialist officers and N.C.O.s.

Flying training takes place at Negombo on Chipmunks, and it is hoped that the cadets will later receive advanced training.

Though the great majority of aircrew cadets will be trained in Ceylon, some will be sent at intervals for training at the R.A.F. College, Cranwell. Three have already been posted there. A number of aircraft apprentices have also been sent to England for three-year courses at the Radio School, Cranwell, and the Aircraft Apprentices' Technical School, Halton, for training as radio mechanics, instrument-makers, fitters, electricians and riggers.

CHARM HATH MUSIC: These four expressive studies of bandswomen of the W.R.A.F. Central Band were taken while they were performing at the recent W.R.A.F. passing-out parade at Wilmslow, Cheshire. (Left to right) Cpl. Enid Ballard, A/C.W. G. Hemsley, A/C.W. Vicki Evans, who spent the war years in Holland, and L.A/C.W. Dorothy Winteringham.

SERVICE AVIATION . . .

Basic ground-training for airmen is to be carried out at Diyetalawa, a hill station at 4,000ft in the Central Highlands. A spacious camp previously occupied by the Army has been taken over and is being modernized to house the pupils.

The Royal Ceylon Air Force will have its own ensign. It will be similar in design and colour to the Royal Air Force Ensign, with the national flag—a yellow emblematical lion on a maroon ground—superimposed at the upper left-hand corner; in the lower right-hand corner will be a roundel. The roundel will consist of two concentric circles, the inner red and the outer yellow, spanned on either side by a thick bar, the top half of which will be orange and the lower half green.

The formation of a Ceylon Air Training Corps has also been approved, with flights at the larger schools throughout the island.

Schoolboy Guests

YESTERDAY 26 selected schoolboy-members of the R.A.F. sections of the Combined Cadet Force were due to leave Blackbushe, Hants, by air to make a seven-day visit to 2nd T.A.F. They are to be guests of the C.-in-C., Air Marshal Sir Robert M. Foster.

They will see demonstrations of ground-attack training at Fassberg and be given the opportunity of flying in Meteor 7s. Scharfoldendorf will be visited to watch gliding, Gutersloh to spend a day and a night with a reconnaissance wing, and Wahn to see night fighters in operation.

The boys, with two masters—S/L. D. F. Perrins, D.S.O., D.F.C., R.A.F.V.R.(T), of Eastbourne College and F/L. K. R. Stoker, A.F.C., R.A.F.V.R.(T), of Fettes, will fly to Germany and back in a Valetta of No. 622 Transport Squadron; No. 622, operated by Airwork, Ltd., is the first of the new R.Aux.A.F. transport units.

TRADITIONAL in having a white ensign at the stern (actually painted on the fin) is this D.H. Sea Hornet N.F.21 of No. 809 Squadron flown by the squadron's commanding officer.

C.F.S. Magazine

MR. T. O. M. SOPWITH is one of the contributors to the March issue of the *Central Flying School Magazine*. In it he writes at length on "Modern Aircraft Development," discussing the imponderables of present-day deltas and recalling adventures with the 1914 Sopwith Schneider Tabloid to point the moral.

An item in the news section states that the instructors' course has been increased to 16 weeks—eight at South Cerney and the remainder at Little Rissington. At South Cerney the first week is devoted to leadership training and seven weeks to basic training on Prentices. The course divides at Little Rissington, the majority of the students going on to Harvards and the rest on to Meteors.

The extra length of the course is intended to enable the students to devote more time to revision and private study.

R.Aux.A.F. Summer Camps

PILOTS of 14 squadrons of the Royal Auxiliary Air Force are to fly overseas to summer practice-camps, half of them to Malta and half to Germany. Ground crews will be flown out in transport aircraft. The other six squadrons will spend their fortnight's camp at Fighter Command stations in England and Scotland.

Last year no summer camps were held, as the squadrons were called up for three months' continuous training, which they did at their home stations and at regular fighter stations, with a fortnight at the armament practice-camp at Acklington (Northumberland).

The squadrons to visit Malta (where they will be based at the R.A.F. Station Takali) are No. 501 (County of Gloucester), Vampire 5, Aug. 16th-30th; No. 601 (County of London), Vampire 3, June 14th-28th; No. 604 (County of Middlesex), Vampire 3, May 31st-June 14th; No. 605 (County of Warwick), Vampire 5, June 28th-July 12th; No. 608 (North Riding), Vampire 3, Aug. 30th-Sept. 13th; No. 612 (County of Aberdeen), Vampire 5, July 12th-26th; No. 613 (City of Manchester), Vampire 5, July 26th-Aug. 9th.

Visiting the 2nd Tactical Air Force in Germany and based at R.A.F. Station Celle, will be No. 600 (City of London), Meteor 8, May 31st-June 14th; No. 504 (City of Nottingham), Meteor 4, July 19th-Aug. 2nd; No. 602 (City of Glasgow), Vampire 5, July 19th-Aug. 2nd; No. 603 (City of Edinburgh), Vampire 5, July 5th-19th; No. 609 (West Riding), Meteor 8, June 7th-21st; No. 616 (South Yorkshire), Meteor 8, July 5th-19th; No. 615 (County of Surrey), Meteor 8, May 31st-June 14th.

The three squadrons to visit R.A.F. Station, Leuchars, Fife, are No. 500 (County of Kent), Meteor 8, June 28th-July 12th; No. 607 (County of Durham), Vampire 5, July 12th-26th; No. 611 (West Lancashire), Meteor 8, June 14th-28th.

At R.A.F. Station, Tangmere, Sussex, will be No. 610 (County of Chester), Meteor 8, Aug. 9th-23rd; No. 614 (County of Glamorgan), Vampire 5, June 21st-July 5th.

No. 502 (Ulster) Squadron's Vampire 5s will fly from their base at Aldergrove to R.A.F. Station, Biggin Hill, Kent, for the period July 19th-Aug. 2nd.

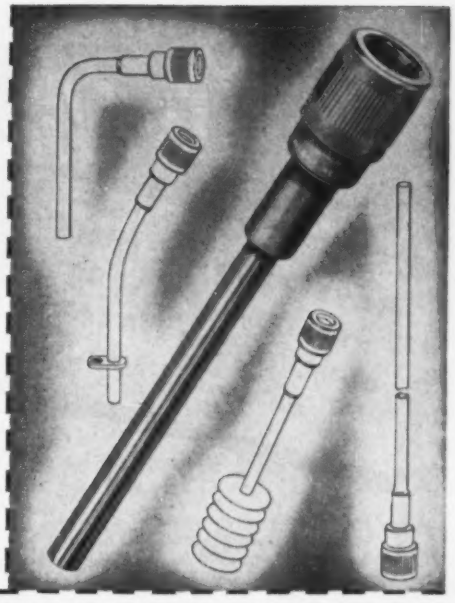
Reunions

THE 619 Squadron (5 Group) annual informal reunion dinner will be held this year at the Magpie and Stump Inn, 18, Old Bailey, London, E.C.4, on Saturday, May 3rd, at 6.30 p.m. Jack Howard, the organizer, will be glad to receive applications for tickets, with remittance of 10s 6d, at The Hatcheries, Kibworth, Leics.

The third post-war reunion dinner for officers of No. 3 Fighter Squadron is to take place at the Savoy Hotel, London, on August 22nd. It is being organized by F/L. E. R. A. Shelton, R.A.F. Station Wildenrath, 2nd T.A.F., B.A.O.R. 34.

Weston Resistance Bulbs

The Model S.110 Platinum Resistance Bulb, used in conjunction with a Weston circular scale indicator is greatly superior in every respect to other methods of temperature measurement. Its platinum element is the most stable, accurate and the smallest yet produced for practical applications. Due to the very small size of the resistance element, the response time is extremely rapid. Reliability and long life are ensured by the fact that the element is hermetically sealed into a ¼" o/dia. stainless steel sheath which is fitted with a watertight plug connection. The socket is moulded integrally with special cable which is supplied. The Model S.110 is suitable for temperatures between −200°C. and +500°C.
Full details of Weston equipment for aircraft will gladly be supplied on request.



WESTON
AIRCRAFT INSTRUMENTS

SANGAMO WESTON LIMITED
ENFIELD MIDDLESEX
Tel: Enfield 3636 (6 lines) 1242 (4 lines) Grams: Sanwest, Enfield
Scottish Factory: Port Glasgow, Renfrewshire
Branches: Glasgow, Manchester, Newcastle-on-Tyne, Leeds, Liverpool, Wolverhampton, Nottingham, Bristol, Southampton, Brighton

THE "COMET" APPROVED FOR PUBLIC TRANSPORT

Britain is the first country to issue a Certificate of Airworthiness for an all jet airliner, the de Havilland Comet.
The four "Ghost" gas turbine engines incorporate centrispun and centrifugally cast rings and many other fabricated components in Firth-Vickers special Heat- and Creep-Resisting steels.
The continuous technical development of these special steels achieves the improvements in performance and efficiency of gas turbine units on land, sea and in the air.

FIRTH-VICKERS HEAT-RESISTING STEELS

FIRTH-VICKERS STAINLESS STEELS LTD., SHEFFIELD
TELEPHONE - SHEFFIELD 42051

ME Universal Joints

HAVE PROVEN THEIR RELIABILITY FOR OVER TWENTY YEARS in all types of aircraft

We also specialise in the production of precision aircraft components, as well as tooling equipment for increased production including gauges of all types, jigs and fixtures, special machines, etc.

THE *NEW* LIGHT SERIES "HOOKE'S" TYPE

SPECIALLY DEVELOPED FOR THE AIRCRAFT INDUSTRY. For light loads. These joints are made in light alloy with hardened and ground trunnion pins, cadmium plated. Design is based on our standard Hooke's type joint, but dimensions have been altered to suit the bores of standard aircraft tubes. Made in five sizes which can be varied to suit particular requirements.

THE STANDARD "ME" UNIVERSAL BALL JOINT

UNSURPASSED FOR HIGH PERFORMANCE ON DIFFICULT ANGULAR DRIVES. Simple. Sturdy. Reliable. For heavy loads. These qualities account for the increasing use of ME universal ball joints throughout the aircraft industry. 92 per cent. to 98 per cent. efficient (N.P.L. certified) they are the lightest and most compact ball joints yet produced. Nine standard sizes for shaft diameters of ¼ in. to 1¼ in. Dirt excluding covers available for both types.

THE MOLLART ENGINEERING COMPANY LTD.
KINGSTON BY-PASS, SURBITON, SURREY, ENGLAND
Tel.: ELMBRIDGE 3352/3/4 'Grams.: PRECISION, SURBITON

Air Ministry Gauge Test House Authority 89755/31

Thermometer Tester

Thermo-couple Type

- *ROBUST WITH SUB-STANDARD ACCURACY.*
- *SENSITIVE CONTROL.*
- *SUITABLE FOR TESTING:-*

Jet Thermometer Indicators, Leads, Thermo-couples and Voltage Compensators.

Engine Cylinder Thermometers, Leads and Thermo-couples.

Tail Bearing Thermometers.

Also available: Gyro Instrument Test Tables (electrically or air operated instruments).
Pressure Gauge Testers.
Low Pressure Chambers.
Stroboscopic Testers.
Luminous and Fluorescent Comparators.

BRYANS

AEROQUIPMENT LIMITED

WILLOW LANE, MITCHAM JUNCTION, SURREY
Telephone: Mitcham 1607/8/9

THE WAY TO BIGGER OUTPUT

Britain's 3rd

MECHANICAL HANDLING

EXHIBITION & CONVENTION

OLYMPIA, LONDON JUNE 4-14th, 1952

Organised by "MECHANICAL HANDLING" the journal of industrial mechanization

The Exhibition which shows how to achieve larger production at lower costs

Mechanical handling speeds production and cuts costs, smashing bottlenecks, increasing output per man-hour and feeding key machines at non-stop pressure.

Next June, at Olympia, you can inspect the most comprehensive display of handling plant ever assembled. Experts will explain and demonstrate the very latest equipment for every class of industry—equipment more advanced and efficient than anything available hitherto.

At the Convention, held simultaneously, mechanical handling's vital part in modern production layouts will be discussed by recognised authorities. This exhibition is a "must" for every progressive industrialist, engineer and production executive.

The world's largest display of
Conveyors. Elevators. Hoists. Stackers. Cranes. Mechanical Loaders and Shovels. Fork Lift Trucks. Industrial Trucks. Coal Handling Plants. Overhead Runways. Aerial Runways. Grain Handling Plants. Wagon Tipplers. Ancillary Equipment, etc.

Working Exhibits
Many of the exhibits will be operating, a facility made possible by the vast area of 250,000 square feet.

Consulting Service
Consulting engineers will be available without charge, and appointments can be made in advance.

Industrial Cinema
Films showing various types of equipment in actual use will be screened in the Exhibition Theatre.

PLAN YOUR VISIT WELL AHEAD—POST THIS ENQUIRY TODAY

SEND NOW FOR FULL DETAILS!

To "Mechanical Handling," DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

Please send the 1952 Exhibition brochure, free season ticket, Convention details, etc.

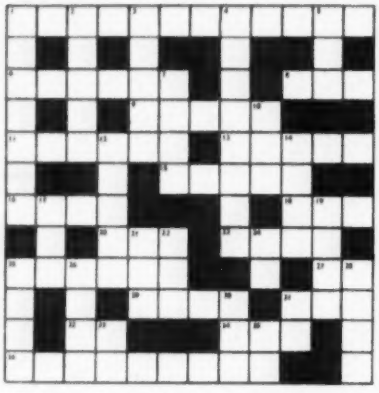
Name _____

Firm _____

Address _____

24

DON'T USE CROSS WORDS



ACROSS.—1, We specialise in this sort of alteration. 6, We've got a million of 'em! 8, They are at the beginning of arbitration. 9, You can do this sometimes under bumpy conditions! 11, Dwarfishness. 13, This is all-important where jets are concerned. 15, A pocket size ship lies at the mouth of this River. 16, Pilots don't keep this sort of log. 18, Not at the beginning. 20, Delirious. 23, Its movement depends upon the Moon. 25, A Miles-in-charge? 27, A Roman copper coin. 29, Tibetan monk or priest. 31, Devoured. 32, Certainly not! 34, Humorous gent! 36, Wise people come to us for these.

DOWN.—1, Large lumps of stone? 2, Run off. 3, Exercises the sense of touch. 4, You can't do better than entrust one of these to us. 5, Belonging to. 7, This sort of lubrication is sometimes dry. 10, Three in a row makes this trick. 12, Indisposed to move or act. 14, Want. 17, A succulent fruit. 19, The Navy prefers rum this way. 21, An electric one will shock you. 22, Age. 24, Not out! 25, Single. 26, A kind of wave. 28, Despatch. 30, Shoemaker's tool. 31, Centre of Bath. 33, Introduces alternatives. 35, Exists.

(Solution in May 2nd issue)

USE

Aviation Traders Limited

FOR ALL TYPES OF

OVERHAULS, REPAIRS & MODIFICATIONS

A.I.D & A.R.B. APPROVED

For further details apply

15 Gt. Cumberland Place
London W.1

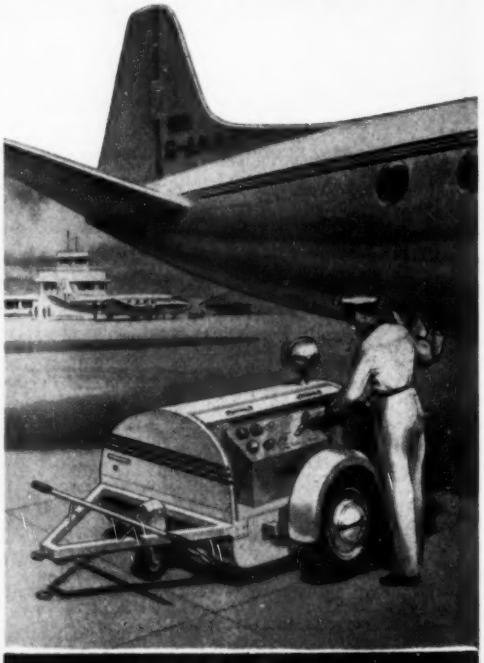
Telephone: AMBASSADOR 2091

Telegrams: AVIATRADE, LONDON

AIRCRAFT AST EQUIPMENT

Aircraft Toilet Servicing Unit

THE Mark IV is designed for use at air terminals, and has a capacity to service 20-25 completely full lavatories, with additional drain fittings for connections to the waste water system from pantry, etc. Can be electrically or manually operated by one man, and illumination for night servicing is provided.

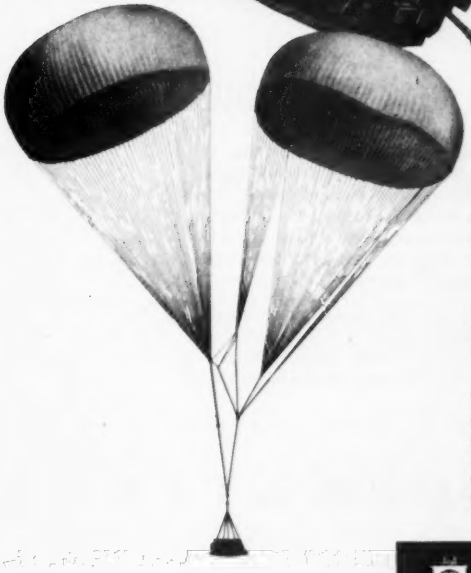


AIRCRAFT DIVISION

AIR SERVICE TRAINING LTD

HAMBLE SOUTHAMPTON

A Member of the Hawker Siddeley Group



PARACHUTES produced by Pioneer MAKE THE DIFFERENCE!

Yesterday's miracles are now daily scheduled performances. Not long ago, it seemed incredible that a plane could be built big enough and powerful enough to lift and fly heavy cargoes like jeeps, howitzers and steel bridges and other equipment weighing many tons! . . . It seemed even more incredible that parachutes could be built large enough and strong enough to drop these cargoes safely.

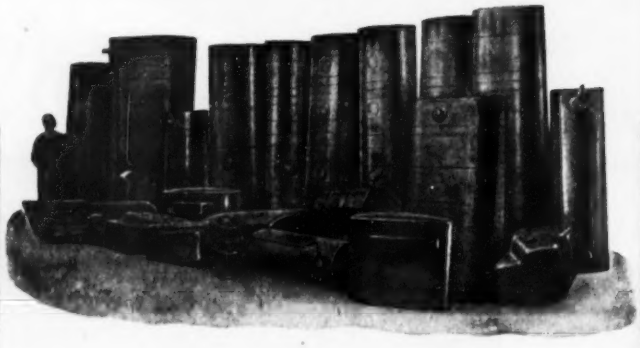
Today "non-stop" airlifts are dropping cargoes of every kind swiftly, surely and safely, on target wherever they are needed on a daily scheduled performance . . . made possible by *dependable* cargo chutes!

Throughout the development of this vital operation, The Pioneer Parachute Company has kept pace with the industry's needs. Pioneer's years of experience, research and vast production facilities have built absolute dependability into every Pioneer parachute. These qualities have made and kept Pioneer the acknowledged world leader in parachute manufacturing.

PIONEER PARACHUTE COMPANY, INC.
MANCHESTER, CONNECTICUT, U. S. A.

EVERYTHING IN SHEET METAL WORK

AND LIGHT ENGINEERING



AIRCRAFT
AUTOMOBILE
COACH AND BUS BODIES
Municipal and other ALL-METAL Vehicle Bodies

Refrigeration
COLD STORAGE
HEATING
DRYING
AIR Conditioning
MINING

TELEGRAMS: BROMELPAR, SOUTHTOT, LONDON
161 WEST Rd., TOTTENHAM

E. G. Brown & Co. Ltd

TELEPHONES: TOTTENHAM 2257, 2258 & 2259
LONDON, N.17

Teddington CONTROLS

CABIN TEMPERATURE CONTROLS

Today, the requirement for a cabin air conditioning system exists in nearly every type of aircraft, and we have designed and supplied units ranging from simple thermostats to complete conditioning systems. The problems associated with thermal lags, which have long been a source of trouble in maintaining stable control, have been recognised and largely overcome, and controls of great flexibility have been developed to meet the stringent requirements of modern aircraft.

Several different types of controller have been developed, new methods of signal amplification are being investigated and a large amount of data is being accumulated from rig tests and actual flying. Whatever aspect of aircraft cabin air conditioning interests you, we will be pleased to put our experience at your disposal.

Teddington

Teddington AUTOMATIC CONTROLS

TEDDINGTON CONTROLS LTD., CEFN COED, MERTHYR TYDFIL, SOUTH WALES. Merthyr Tydfil 666

AIRCRAFT FINISHES

used on the de Havilland Comet

Powered by four de Havilland Ghost turbojets, the Comet's cruising speed of nearly 500 m.p.h. makes it ideal for use on international express services. This high speed airliner is finished with high quality materials manufactured by Titanine.

Apply for demonstration and particulars from

TITANINE LIMITED

COLINDALE - LONDON - N.W.9

Telephone: Colindale 8123 (6 lines).

Factories
LONDON · SURREY · SCOTLAND

Associated Companies
U.S.A. and HOLLAND

FLIGHT
and
AIRCRAFT ENGINEER

PRESS DAY — *Classified advertisement "copy" should reach Head Office by* FIRST POST THURSDAY *for publication in the following week's issue subject to space being available.*

CLASSIFIED ADVERTISEMENTS

Advertisement Rates. 4/- per line, minimum 8/-, average line contains 6-7 words. Special rates for Auctions, Contracts, Patents, Legal and Official Notices, Public Announcements, Tenders 5/- per line, minimum 10/-. Each paragraph is charged separately, name and address must be counted. All advertisements must be strictly prepaid and should be addressed to FLIGHT Classified Advertisement Dept., Dorset House, Stamford Street, London, S.E.1.

Postal Orders and cheques sent in payment for advertisements should be made payable to Iliffe & Sons, Ltd., and crossed & Co.

Trade Advertisers who use these columns regularly are allowed a discount of 5% for 13, 10% for 26 and 15% for 52 consecutive insertion orders. Full particulars will be sent on application.

Box Numbers. For the convenience of private advertisers Box Number facilities are available at an additional charge for 2 words plus 1/- extra to defray the cost of registration and postage, which must be added to the advertisement charge. Replies should be addressed to "Box 0000, c/o Flight," Dorset House, Stamford Street, London, S.E.1.

The Publishers retain the right to refuse or withdraw advertisements at their discretion and do not accept liability for delay in publication or for clerical or printer's errors although every care is taken to avoid mistakes.

Situations Vacant. The engagement of persons answering these advertisements must be made through the local office of the Ministry of Labour and National Service etc. if the applicant is a man aged 18-64 or a woman aged 18-59 inclusive, unless he or she or the employer is excepted from the provisions of The Notification of Vacancies Order 1952.

IMMEDIATE DELIVERY!

AIRWORK
LIMITED

HAS BEEN GRANTED
EXCLUSIVE RIGHTS OF SALE
FOR

THREE
USED
'DOVES'

WHICH ARE NOW AVAILABLE FOR IMMEDIATE DELIVERY

Particulars and Prices from
THE SALES DEPARTMENT
AIRWORK LIMITED
15 CHESTERFIELD STREET
LONDON, W.1.

AIRCRAFT FOR SALE

W. S. SHACKLETON LTD.
FOR CIVIL AIRCRAFT
OF EVERY DESCRIPTION
★
FOR PURCHASE OR SALE
IN ANY PART OF THE WORLD
★
FOR QUOTATIONS DELIVERED
C.I.F. BY AIR OR SEA
★
FOR ANY AERONAUTICAL
INQUIRY
write to
Europe's largest aircraft dealers,
W. S. SHACKLETON LTD.
(20 years at this address—120 different types of aircraft sold)
175 PICCADILLY,
LONDON W.1.
Phone: Regent 2345-6.
Cables: Shackbud, London. (0070)

AEROSERVICES (LONDON) LIMITED
will gladly send specifications—to Principals only—of the following aircraft:—
DOUGLAS C.47
CURTISS C.46
CONVAIR
LIBERATOR
LODESTAR
DOVE
RAPIDE
PROCTOR
AUSTER
At least one of each of these types is available at the time of going to press.
Write, telephone or cable:—
AEROSERVICES (LONDON) LIMITED
46, HERTFORD STREET,
PARK LANE,
LONDON, W.1.
Tel.: GROsvenor 8383.
Cables: AEROPAUL, London. (0940)

VENDAIR
CROYDON AIRPORT
offer for sale
DAKOTAS, EXPEDITOR AND CATALINA
1830/92 ENGINES AND 1830/90D ENGINES
VENDAIR
CROYDON AIRPORT
Croydon 5777
(0603)

R. K. DUNDAS, Ltd.
NEW PROCTOR V, complete with dual control, long-range tanks, 4-channel V.H.F., navigation and landing lights, and of course 12 months C. of A.
£1300
R. K. DUNDAS, Ltd., 25 Bury Street, London, S.W.1.
WHI. 2046. Cables: "Dundassero, Piccy, London."
WCROYDON Airport: CRO. 0638. (0559)

FOR sale. Miles Messenger aircraft, C. of A. until February 21st, 1953. New engine just fitted; in excellent condition. Offers.—Box 8265. (7971)

AIRCRAFT ANCILLARY EQUIPMENT

Large stocks of new and unused clothing, life saving, oxygen and electrical equipment for aircraft.

GROUND CREW AND ENGINEER'S OVERALLS

Large supplies already delivered to many foreign governments; certificates available.

We welcome home and overseas inquiries giving either description or R.A.F. vocabulary section and reference numbers.

D. LEWIS LTD.
Flying Clothing Manufacturers for Home or Export
(DEPT. F)
124 GT. PORTLAND ST., LONDON, W.1
Trade Inquiries Invited.
Tel.: Museum 4314 *Tel.: Aviakit, Wesdo, London*

DAKOTA SPARES

Undercarriages—all parts available.
Wheels complete.
Exhaust Collector Rings complete.
Exhaust Tail Pipes, Brake Drums.
All for immediate delivery ex stock.

Staravia
BLACKBUSHE AIRPORT
CAMBERLEY, SURREY
Tel.: Camberley 1600

AIRCRAFT SPRING WASHERS

TO B.S. SPECIFICATION SP.47

CROSS MFG. (1938) LTD., COMBE DOWN, BATH

AMAL *Component Specialists to the Aircraft Industry*

AMAL LTD., HOLDFORD ROAD, WITTON, BIRMINGHAM 6

AIRCRAFT FOR SALE

AEROCONTACTS, Ltd., leading distributors of new and used aircraft. Large stocks held at Gatwick for immediate inspection and early delivery. Specialist stockists of D.H. Dragon Rapides. Aircontactalogue free on request. Gatwick Airport, Horley 1510. [0084

AIRCRAFT WANTED

AUSTER Autocrat with belly tank.—Igloo, Ltd., Cunliffe Road, Blackpool. Tel. 34137. [7982

W. S. SHACKLETON, Ltd., Europe's largest aeroplane dealers, are always looking for good aircraft to supply to clients all over the world, and would welcome offers of any type of aircraft, either for direct purchase, part-exchange, or sale on commission.
W. S. SHACKLETON, Ltd., 175 Piccadilly, London W.1. Tel.: Regent 2448-9. [0071

AIRCRAFT ACCESSORIES AND ENGINES

AERO SALES, Inc., procurement specialists for all American aircraft, engines, accessories. Quotations furnished on all requests.—Address: P.O. Box 37, Miami, International Airport Branch, Miami 66, Florida, U.S.A. London Agents: C. J. Fox and Sons, Ltd., 117, Victoria Street, London, S.W.1. Tel.: Victoria 0904/5. [0045

AIRCRAFT SERVICING

BROOKLANDS AVIATION, Ltd., Brooklands Aerodrome, Weybridge. C. of A. overhauls, modifications and conversions. Tel.: Byfleet 436. [0305

REPAIRS and C. of A. overhaul for all types of aircraft. Brooklands Aviation, Ltd., Civil Repair Service, Sywell Aerodrome, Northampton. Tel.: Moulton 3381. [0307

BUSINESS AND PROPERTY

HASTINGS AERODROME

THE Corporation wish to let for a term of years, or for this season only, this aerodrome containing approximately 68 acres. Offers to the Town Clerk, Town Hall, Hastings, before Wednesday, April 30th, 1952.

N. F. LESTER,
Town Clerk.

Town Hall,
Hastings.
April 3, 1952 [7987

CARAVANS

A CARAVAN LOT

THERE are lots of caravans on many roadside lots nowadays. And a lot is naturally said about them by the sellers! But you can be certain that by far the largest lot of all, offered by U.K.'s biggest caravan distributor is an absolutely genuine lot with all the outer mouldings sealed and genuine waterproof hardboard panels with a lot of guarantee (so they've got to be good vans) and the means to carry it out. All repairs free for a year and a fine van lent free for a leaky one. And a lot more and better sites from the Caravan Residents Association (A.S.J. Secretary). Good h.p. terms, too. So why not send for a lot more brochures—1 lb. in weight to Taplow, please. A. S. Jenkinson, Ltd. Our easily selection, London Branch, 30 Oxford Street (Tel.: Langham 3606-7) (Corner Rathbone Place), London W.1. 2 mins. from Tottenham Court Road Tube Station. Open 7 days a week to 9 p.m. Also at Bath Road, Taplow, Bucks. Tel.: Maidenhead 3434-5-6. Always open. Easy to reach—right on main A4. Outskirts Maidenhead. Taplow Station 2 mins. Now open at Hammersmith Branch, corner of Sussex Place and Hammersmith Bridge Road, W.6. One minute Hammersmith Broadway.

NEW "Statesman" £1,065. Other Berkeleys from £399/10/-. New Glider 4-berth de luxe, £339/10/-, and 2-berth, £212. Safari, £308. Towing. Hire purchase.—Mantles Garages, Ltd., Biggleswade. Tel. 2115. [0087

CLOTHING

R.A.F. and R.N. officers' uniforms purchased; large selection of R.A.F. officers' kit for sale, new and reconditioned.—Fisher's Service Outfitters, 86-88, Wellington St., Woolwich. Tel.: Woolwich 1056. [0097

CLUBS

REDHILL FLYING CLUB.

LEARN to fly at Redhill Aerodrome, Surrey. South London's nearest flying centre. 23 miles from Hyde Park corner. £3/10/- per hour dual; from £2/10/- solo; instrument flying, instructors' and advanced courses. Attractive clubhouse with full catering facilities.—Tel.: Nutfield Ridge 2245. [0347

HERTS and Essex AERO CLUB, Bronbourne Aerodrome, Nassing, Essex. M.C.A. approved 30-hour course; solo flying from 30/- per hour; residential; trial lessons 35/-; train from Liverpool Street, or Green Line Coach 715.—Tel.: Hoddesdon 2849, 3441, 3705. [0230

CONSULTANTS

WING COMMANDER R. H. STOCKEN, F.R.Ae.S.; Eagle House, 109, Jermyn St., London, S.W.1. Tel.: Whitehall 9895. [0419

HANGARS

FOR sale, Hangar (all steel), 113ft clear span by 135ft long by 26ft clear height at eaves, rising to 36ft clear at apex. Doors each end (gable optional).

HANGAR (all steel), 80ft clear span by 144ft long by 22ft clear height at eaves, rising 32ft to apex. Doors one end.

STEEL building 60ft clear span by 144ft long by 22ft clear height at eaves. Large sliding doors in sides.

CURVED steel building 30ft span by 17ft 6in high at apex. Up to 600ft long (low price).

BELLMAN HANGARS, Ltd., Terminal House, London, S.W.1. [7977

INSURANCE

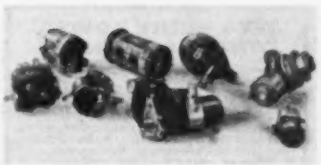
ALL types of aircraft insurance and personal accident cover.—Apply to J. W. T. Amey, Messrs. R. J. Moffat and Co., Percy House, 796, High Rd., Tottenham, N.17. Tel.: Tottenham 2003-4-5. [0584

MISCELLANEOUS

BALLOON winches powered by Ford V8 engines, believed very suitable for towing gliders. Several available for disposal. Offers invited.—Foundation Oil Co., Ltd., 8, Orford Hill, Norwich. Phone 20207. [7930

PACKING AND SHIPPING

R. AND J. PARKS, LTD., 143-9, Fenchurch St., E.C.3. Tel.: Mansion House 3083. Official packers and Shippers to the aircraft industry. [0012



Electrical Supplies

AN aeroplane is nothing more or less than an airborne mass of Electrical Equipment held together by the airframe and directed by the radio installation assisted in a small way by the pilot, and it is the aforesaid mass of electrical equipment which concerns the whole of one department here at Aerocontacts.

WE can supply anything from the tiniest lug to the largest heavy duty engine-driven generators upon which every vital service in the aircraft depends. The complete range includes: press button switches; dimmer switches; ignition switches; magnetic relay switches; immersion switches; inertia switches; master switches; micro switches; fuses and fuse boxes; terminal blocks; voltage regulators; generators; inverters; accumulators; cable; starter motors; wind-driven generators; wind screen wiper motors; plugs; sockets, filaments; navigation lamps; warning lamps; identity lamps; Aldis lamps; landing lamps; recognition lamps; instrument lamps; Anglepoise lamps; suppressors; contact breakers, etc., etc., etc., and all are available from stock released to the requirements of either the Air Registration Board or the Aeronautical Inspection Directorate as required.

IN order to assist interested customers and purchasing officers, we have produced interim electrical lists in the ranges 5C/, 5L/, 5U/, and 5X/ as well as a composite list covering their American equivalents and these will happily be forwarded on request. Further lists are at present being compiled and applicants' names will be placed on our mailing list for all future issues. Our well-equipped Workshop is, of course, always available for the overhaul of clients' own gear for Certificate of Airworthiness and general maintenance and all orders will receive our most prompt attention.

TIME RECORDERS

STAFF item checking and job-costing time recorders (all makes) for quick cash sale; exceptional condition.—Box 7241. [0040

TUITION

LONDON SCHOOL OF AIR NAVIGATION (1949), Ltd.

PERSONAL coaching for Commercial Instrument R Rating, Senior Commercial, A.L.T.P. (conversion thereto) and Flight Navigator licences. This school provides the most rapid and economical method of qualifying. LC.A.O. standards.

COMPLETE "Study-as-you-work" courses. Simulates classroom instruction; lesson questions, model answers. Unique in application, ideal those employed or seeking career from Services.

LINK instruction and R/T for all Instrument Rating procedures. Any form of flying training at best quotations.—Brochure with terms: 9-10, King Street, London, W.6. Tel.: Riv. 7400. [0277

LEARN to fly for £24; instructors' licences and instrument flying for £5 an hour; night flying £3/10/- an hour, residence £1 p.w. weekly. Approved M.C.A. private pilot's licence course.—Wiltshire School of Flying, Ltd., Thruxton Aerodrome, Andover, Hants. [0283

A. P.R.Ae.S., A.R.B.Cert., A.M.I.Mech.E., etc., on "no pass, no fee" terms; over 95% successes. For details of exams and courses in all branches of aeronautical work, navigation, mechanical eng., etc., write for 144-page handbook free.—B.I.E.T. (Dept. 702), 17, Stratford Place, London, W.1. [0707

FREE! Brochure giving details of courses in all branches aero. eng., covering A.F.R.Ae.S., M.C.A. exams., etc. We are the only postal training college operated by an industrial organization.—Write to: E.M.I. Institutes, Postal Division, Dept. F29, 43, Grove Park Road, London, W.4. Tel.: Chiswick 4417. (Associated with H.M.V.) [0026

SOUTHEND-ON-SEA MUNICIPAL FLYING SCHOOL, Essex. Tel.: Rochford 54294. Comprehensive training for private commercial licences and instructors' endorsements. M.C.A. approved for 30-hour course. Auster aircraft fitted with radio. Hourly rates: Solo, day £5, night £6; dual 5/- extra; contract rate £2/10/-. Link trainer 10/-. No fees or subscriptions. Please write for further details. [0332

COLLEGE OF AERONAUTICAL AND AUTOMOBILE ENGINEERING, Chelsea and Redhill Aerodrome. Diploma course in aeronautical engineering combine full day workshop and technical training with coaching for A.Ae.S. Associate Fellowship examination. Parts 1 and 2 aircraft engineers, licences, etc., in preparation for executive positions.—Syllabus from the College Secretary, Sydney Place, Chelsea, S.W.3. Tel.: Flaxman 0021. [0016

THE COLLEGE OF AERONAUTICS. A course of lectures on Compressibility Effects in Aerodynamics, will be given at the College from Monday, May 19th, to Friday, May 30th, 1952. The course will cover both subsonic and supersonic flow and is designed to meet the needs of members of the aircraft industry or research establishments who wish to acquire a grounding in the subject and a guide to recent developments. Particular attention will be paid to problems of flight at high speeds. Fees for the course are: Tuition fee, £21; residence charge (including full board), £11/10/-. Copies of the syllabus and forms of registration can be obtained from the Registrar, The College of Aeronautics, Cranfield, Bletchley, Bucks. [7984

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through the local office of the Ministry of Labour and National Service, etc., if the employment is a man aged 18-64 or a woman aged 18-59 inclusive, unless he or she or the employer is excepted from the provisions of The Notification of Vacancies Order 1952.

CITY OF COVENTRY EDUCATION COMMITTEE
COVENTRY TECHNICAL COLLEGE

PRINCIPAL: H. V. FIELD, B.Sc., Wh.Sch., M.I.E.E.

APPLICATIONS are invited for the full-time teaching appointment of Lecturer in MECHANICAL ENGINEERING, to commence duties as soon as possible.

CANDIDATES should be honours graduates or hold equivalent qualifications and have had appropriate industrial or service experience. They should have a special knowledge of some branch of mechanical, production, automobile or aeronautical engineering, and it would be an added advantage if the candidate is familiar with either management studies, welding, sheet metal work or pattern making.

SALARY in accordance with the Burnham Technical Scale for Lecturers (£600 by £25 to £1,000).

APPLICATION forms and further information obtainable from the undersigned to whom the completed forms should be returned within 14 days of the appearance of this advertisement.

W. L. CHINN, M.A.,
Director of Education.
Council House,
COVENTRY. [7973

SUDAN GOVERNMENT

THE Civil Secretary's Department requires three airport commandants, aged 30 to 42 or thereabouts, for service in the Sudan. Candidates should have administrative experience, preferably in aviation, knowledge of air traffic control and telecommunications procedure as laid down by I.C.A.O., knowledge of aircraft crash, fire and rescue prodecures and must have experience of staff control.

APPOINTMENT will be on probation for a short-term contract for six years, on a salary range £E1225 to £E1675 with post-service bonus. The starting rate would be determined according to age, qualifications and experience, and a cost-of-living allowance may also be payable. Annual leave after the first year. Outfit allowance of £E50 is payable on appointment. Free passage on appointment. There is at present NO INCOME TAX in the Sudan.

FURTHER particulars and application form will be sent on receipt of a postcard only, addressed to the Sudan Agent in London, Wellington House, Buckingham Gate, London S.W.1, quoting "Airport 703" and name and address in BLOCK LETTERS. [7972

AIR SERVICE TRAINING, Ltd., require:

STAFF signallers (Air) for flying duties with navigation school. Ex-R.A.F. signallers suitable.—Apply in first instance to the Commandant, Air Service Training, Ltd., Hamble, Southampton, Hants. [7975

SALES. Senior assistant required with extensive experience of sales (or purchase) of A.G.S. and similar parts.

PLEASE write, giving full details of experience, age and salary required, to the Secretary, Aircraft Materials, Ltd., Midland Road, London, N.W.1. [7969

SITUATIONS VACANT

CROWN AGENTS FOR THE COLONIES

AIR PILOT required by the Falkland Islands Government for a tour of one year with option of extension to 3 years. Salary £720, rising to £960 a year. Free passages. Liberal leave on full salary. Candidates under 30 years of age must hold a pilot's commercial licence and have had experience of Norseman and Auster float planes. APPLY at once by letter stating age, full names in block letters, and full particulars of qualifications and experience and mentioning this paper to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting on letter M.27662E. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. [7974

HANDLEY PAGE, Ltd., have vacancies for:—

AERODYNAMICISTS of degree standard or with H.N.C. in aero subjects. Previous experience preferred.

WIND tunnel technicians of degree standard or with H.N.C. in aero subjects. Previous experience preferred.

STRESSMEN of degree standard or with H.N.C. in aero subjects. Previous experience preferred.

WEIGHTS engineers with minimum qualifications of O.N.C. Previous experience preferred.

SENIOR design and intermediate draughtsmen, preferably with aircraft experience, for Cricklewood and Radlett offices. Consideration will be given to applicants with experience in light structural or mechanical engineering. Possession of O.N.C. or H.N.C. (Mech. or Elect.) an advantage.

LOFTSMEN with previous experience of full-scale layout work or similar workshop practice.

TECHNICAL authors, preferably with experience in the preparation of maintenance manuals, pilots' notes, technical specifications, etc.

TECHNICAL illustrators with previous experience in general work.—Write, stating age, qualifications and details of experience to Staff Officer, Handley Page, Ltd., Cricklewood, London, N.W.2. [7791

WANTED Link Trainer Instructor with some knowledge of Air Traffic Control. Box 8313. [7958

WEST AFRICAN AIRWAYS CORPORATION invite applications to fill a vacancy for a propeller specialist which will shortly occur in Lagos.

THE successful applicant should hold an "X" (propeller) licence and have experience in the overhaul of De Havilland hydromatic propellers.

THE commencing basic salary will be £690 p.a., which will attract an expatriation pay of £300 p.a. plus a cost of living allowance of £96 p.a. payable from the date of arrival in West Africa.

FREE fully furnished quarters are provided, but due to accommodation difficulties, initial separation from families for a few months is necessary.

LEAVE in the U.K. with free passages, is granted at the rate of 1 5th of the time served in Africa. Tours of duty normally last 15 months.

THE following schemes are at present in operation: Sickness and Accident, Car Purchase, and Pension Scheme. Brief details of the Pension Scheme are as under:—

(a) EMPLOYEES' contributions, 6 per cent. of salary; employers', 16 per cent.
(b) RETIRING age 55, but the staff may elect to retire at 50 after 10 years' service.
(c) AFTER 5 years' service employees who resign may claim a refund of the employers' contributions in addition to their own.

APPLICATIONS should be addressed to the Staff Manager (U.K. Stations and Overseas), B.O.A.C./A.E.U., Airways House, Great West Road, Brentford, Middlesex. [7979

COMMERCIAL pilot, endorsed for Rapide and Auster, required. Commencing salary £750. Excellent prospects.—Box 8325. [7980

NAPIER AND SON, Luton Airport, Beds, require stressmen with three or more years experience in aircraft works, preferably with degree or Higher National Certificate for work on guided missile projects.

APPLY with full particulars to Local Employment Exchange stating salary required. [7984

NAPIER AND SON, Ltd., Luton Airport, Beds, invite applications from technical assistants and experimental engineers of H.N.C. or degree standard for work on:—

(a) Static and dynamic experimental structural analysis.
(b) Structural research.

IN connection with guided missiles projects.—Write, stating age, qualifications, experience and salary required to the Local Employment Exchange. [7985

AIR SERVICE TRAINING, Ltd., require air traffic control officers. Apply, stating age and experience, to the Commandant, Air Service Training, Ltd., Hamble, Hants. [7976

JIG and tool draughtsmen required by Percival Aircraft, Ltd., Luton Airport, Beds., fully experienced.—Applications, in writing, to Manager, Ministry of Labour and National Service, Luton, Beds. [7993

LICENSED radio engineer and radio mechanics at our base at Stansted Airport, Essex.—Apply by letter or telephone, to the Senior Radio Engineer, Aviation Traders Ltd., Southend Airport, Essex. Tel.: Rochford 54401. [7989

BUYER. Assistant to chief buyer urgently required. Previous experience in aviation industry essential. Advise full particulars of previous experience, etc., by letter to:

CHIEF buyer, Aviation Traders, Ltd., 18, Great Cumberland Place, London, W.1. [7985

HANDLEY PAGE (READING), Ltd., The Aerodrome, Woodley, Reading, have a vacancy in their design office for an aerodynamicist to take charge of their small aerodynamics section. Please send full particulars to the Personnel Officer. [7975

CHIEF designer draughtsman required S.E. London area with experience of design and development of aircraft instrument mechanisms.—Applicants should write, stating age and salary expected, with details of experience to Box F.304 at 191 Gresham House, E.C.2. [7912

JUNIOR draughtsman required, S.E. London area, with experience of design and development of aircraft instrument mechanisms.—Applicants should write, stating age, salary expected, with details of experience, to Box F.305 at 191, Gresham House, E.C.2. [7911

WRIGHT estimator required by Percival Aircraft, Ltd., Luton Airport, Beds., for work on fixed wing and helicopter aircraft.—Apply, giving details of age, qualifications, experience and salary required to: Manager, Ministry of Labour and National Service, Luton, Beds. [7992

VACANCIES exist for technicians for development and research work on Gas Turbine combustion systems and rocket motors. Work is of a highly interesting nature calling for enthusiasm. Ability to work on own initiative is encouraged. Education to Degree standard preferable. Apply Reference SA3, Armstrong Siddeley Motors, Ltd., Coventry. [7955

JET ENGINE POWER CONTROLS ENGINEERS

First-class sound practical engineers required. Some experience desirable of the development and testing of aircraft jet engine accessories, particularly flow, acceleration and speed governing controls, burners and pumps. Exceptional prospects of advancement, excellent environment and conditions of employment. Pension Scheme. Also required, two senior and several junior draughtsmen, preferably with experience on light hydraulic controls and fuel metering equipment. Hostel available.

WRITE PERSONNEL MANAGER
DOWTY EQUIPMENT LIMITED
ARLE COURT, CHELTENHAM

preferably in tabulated form, giving details of training and experience and mentioning age and salary expected.

REQUIRED IMMEDIATELY BY WELL KNOWN AUTOMOBILE ENGINEERING FIRM IN NORTH WEST DISTRICT

Designers and Detail Draughtsmen, Jig and Tool Draughtsmen—also Planning Engineers

THESE VACANCIES OFFER GOOD CONDITIONS AND PROSPECTS TO SUITABLE APPLICANTS, SALARY ACCORDING TO AGE, EXPERIENCE AND QUALIFICATIONS

Apply Box No. 8013, c/o *Flight*

CUT OUT

● LAUNDRY CHARGES
● COSTLY RENEWALS
● RISK OF INFECTION

by the use of **CRESCO PAPER TOWELS**

Ideal for every type of cloakroom. The Cresco Service offers Towels and Dispensers of all types, including Automatic Machines. Also Disposal Units for surgical dressings. *Ample supplies always available.*

Write to:—
CRESCO LIMITED, WORTHING

FLYING TRAINING
TO
HIGHEST MODERN STANDARDS
FOR
Private and Commercial Pilots' Licences
Instructors' Rating

TIGER MOTH & AUSTER £3 per hour
NIGHT FLYING - - £4 per hour

Contract Rates on Application
Ministry of Civil Aviation Approval
MARSHALL FLYING SERVICES LTD.
THE AERODROME, CAMBRIDGE
Tel.: CAMBRIDGE 56291

SITUATIONS VACANT

GLOSTER AIRCRAFT Co., Ltd., have vacancies for fully experienced aircraft structural and electrical draughtsmen.—Applications, in writing, stating age, experience and salary required, must be made through an Employment Exchange or Scheduled Agency. [8010

DE. NAPIER AND SON, Ltd., Luton Airport, require a junior technical assistant of Higher National or Inter B.Sc. standard with apprenticeship in engineering (preferably aircraft) for experimental flight development work on servo engines.

APPLICATIONS, giving full particulars of age, experience and salary required, should be sent to the local Employment Exchange. [7943

JIG and tool draughtsmen, senior and junior, required for work on interesting projects. Pension scheme.—Apply to Ministry of Labour for submission to the Personnel Manager, The Fairey Aviation Co., Ltd., Hayes, Middlesex. [7944

LANCASHIRE AIRCRAFT CORPORATION, Ltd., require qualified pilots, navigators and radio officers for their York fleet.—Please forward full details to the Personnel Manager, Lancashire Aircraft Corporation, Ltd., Bovingdon Airport, Hertfordshire. [8000

CHIEF flying instructor required immediately by Midland Aero Club, Birmingham. Commercial licence endorsed for Auster and Tiger Moth aircraft, instructor rating and C.F.S. category necessary for A.T.C. commitments. Salary on B.A.L.P.A. scale for C.F.I. [7946

PROCESS engineers are required by Hawker Aircraft, Ltd., Canbury Park Rd., Kingston-upon-Thames. Must be fully experienced in detailed process layouts, machined components, or fitting details and aircraft sub-assemblies. —Apply fully in writing to Personnel Supervisor. [7940

ASSISTANT chief stressman required by Percival Aircraft, Ltd., Luton Airport, Beds.—Applications, giving full details of qualifications, experience, age and salary required, to the Manager, Ministry of Labour and National Service, Luton. [0568

TECHNICAL authors and illustrators required by Percival Aircraft, Ltd., Luton Airport, Beds. Knowledge of M.o.S. procedure desirable.—Applications, in writing, stating age, experience and salary required, to Manager, Ministry of Labour and National Service, Luton, Beds. [0594

AIRCRAFT engineer, L.A.E., required for 14 months engagement in British West Indies. Licences: A Lockheed XIV, C Pratt and Whitney Twin Wasp. Probability of later permanency. Good rates overseas allowance and paid leave at end of engagement.—Write Box 8284. [7986

GLOSTER AIRCRAFT Co., Ltd., require senior and junior weight engineers. Interesting work on new projects. Permanent positions offered to suitable applicants. —Applications in writing, stating age, experience, qualifications and salary required, must be made through an Employment Exchange or Scheduled Agency. [0012

HYDRAULIC test laboratory assistant required. School Certificate standard. Aged 20-25. A.E.S.D. rates. Experience in aircraft hydraulics an asset but not essential.—Write, stating age, experience and salary required, to Mr. J. W. Wilson, Development Engineer, British Messier, Ltd., Cheltenham Rd. East, Gloucester. [7931

HOBSON LTD. invite applications for positions in the drawing office as follows: designers, detail and modification draughtsmen, checkers, stressmen. The work is concerned with interesting projects connected with fuel metering equipment and hydraulic flying controls for aircraft.—Hobson Works, Fordhouses, Wolverhampton. [0420

STUDIO IRWIN, Ltd., have vacancy for first-class technical artist. Must be widely experienced with ability to execute exploded drawings from blueprints of any engineering subject. Excellent opportunity and high salary paid to the right man.—Write in first instance, giving full particulars to Studio Irwin Ltd., Clough Square, London E.C.4. [7588

IMPORTANT Midlands aircraft engine manufacturer has vacancies for designers and senior and junior draughtsmen. The work is connected with gas turbine engines. Although experience is most advantageous it is not necessarily essential, as training will be given.—Apply in some detail, please, to Armstrong Siddeley Motors, Ltd., Ireference 101, Coventry. [0616

DE. NAPIER AND SON, Ltd., Luton Airport, require a senior technical assistant for flight development testing of experimental engines; academic standard preferably to degree in mechanical engineering, or Higher National Certificate together with some similar previous experience. Work on gas turbines and/or aero engine development would be a special advantage.

APPLY, giving fullest possible particulars of qualifications and previous experience, together with salary expected, to local Employment Exchange. [7942

THE GLOSTER AIRCRAFT Co. requires senior and intermediate stressmen to work on designs and projects of advanced interest. Excellent prospects of advancement for sound and energetic men.—Applications in writing, giving full particulars of technical qualifications, age, experience and salary required, must be made through an Employment Exchange or Scheduled Agency. [0611

APPLICATIONS are invited from senior and intermediate design draughtsmen. Experience of aero-engine design desirable, but not essential. Also checkers. —Please write, stating age and giving details of previous experience in chronological order to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [0630

AIR FORCE, Naval, civil and helicopter aircraft all under design and development at Percival Aircraft, Ltd., Luton Airport, Beds. Applications are invited from senior and junior draughtsmen, and stressmen for work on this interesting programme.—Write, giving details of experience and salary required, to Manager, Ministry of Labour and National Service, Luton, Beds. [0595

SENIOR technical assistant required for the Service Department of The de Havilland Engine Co., Ltd., preferably with experience on reciprocating and gas-turbine engines. Suitable applicant will be required to work on headquarters' staff of the Service Department at Leavesden Aerodrome, near Watford, Herts. In writing, stating age, qualifications and salary required, to the Personnel Officer, The de Havilland Engine Co., Ltd., Leavesden Aerodrome, nr. Watford, Herts. [7948

ENGLISH ELECTRIC at Preston Aerodrome near Blackpool, have vacancies for draughtsmen to work on aircraft design. Men with good aircraft structure or bomb and armament installation experience are invited to apply.—Write, giving full details of qualifications and experience, to Westminster Employment Exchange, Chadwick Street, S.W.1. To ensure that your application is promptly passed to the company, please mark it "English Electric 120K." [7998

A. V. ROE & Co. Ltd., have vacancies for technicians in the wind tunnel section of their aircraft research division at Woodford Aerodrome, Cheshire. Applications are invited from suitably qualified personnel, preference being given to candidates having previous wind tunnel experience.—Applications, stating full particulars of age, qualifications and experience should be made through an Employment Exchange or a Scheduled Agency and addressed to the Labour Manager, A. V. Roe and Co., Ltd., Greengate, Middleton, Manchester. [7970

REQUIRED IMMEDIATELY BY WELL KNOWN AUTOMOBILE ENGINEERING FIRM IN NORTH WESTERN DISTRICT:

AN ASSISTANT METALLURGIST

WITH GOOD THEORETICAL TRAINING AND SEVERAL YEARS EXPERIENCE. MAIN DUTIES: INVESTIGATIONS, WORK PROCESSES AND METALLOGRAPHY. SOUND PROSPECTS FOR APPLICANTS WITH RIGHT EXPERIENCE

APPLY BOX NO. 8012
c/o FLIGHT

COTTON BAGS
FOR SPARE PARTS, ETC.
WALTER H. FELTHAM & SON, LTD.
Imperial Works, Tower Bridge Road,
Telephone: HOP 1784 LONDON, S.E.1

SITUATIONS VACANT

SENIOR technical assistant required for Engine Technical Office. Knowledge of engine stress calculations and mechanical testing including vibration analysis desirable. B.Sc. and/or A.M.I.Mech.E. preferred.—Please write, giving age, previous experience and qualifications, in chronological order, to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. (7947)

APPLICATIONS are invited from design draughtsmen and stressmen, also technical assistants with combined design and performance experience for work on both reciprocating and gas turbine aero engines.—Applications should state full particulars of experience and qualifications and should be addressed to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. (7832)

NORMALAIR, Ltd., require for their London Office, first-class design and detail draughtsmen, experienced in light mechanical precision engineering or instrument practice and with aircraft background, for aircraft pressurising and high altitude breathing equipment. Good working conditions and superannuation.—Apply, stating age, experience, qualifications, and salary required to Employment Exchange (N.A.), Yeovil, Somerset. (7909

HANDLEY PAGE (READING), Ltd., The Aerodrome, Woodley, Reading, have vacancies in their design office for senior and intermediate aircraft draughtsmen and for a senior electrical draughtsman. The positions are progressive and offer good scope to the right men for advancement.—Please send full particulars to the Personnel Officer, or apply through your local Employment Exchange. (7674

D. NAPIER AND SON, Ltd., Luton Airport, Beds., require electronic engineer of Degree of H.N.C. standard for development work on experimental vibration analysis and the associated electronic measuring and recording equipment in connection with guided missiles projects. Applicants should apply to the Local Employment Exchange, stating age, qualifications and salary required. (7902

STRUCTURAL test engineers are required for the aircraft division of the English Electric Co., Ltd., at Warton Aerodrome near Blackpool. These are interesting vacancies on new projects offering good prospects to suitably qualified engineers experienced in this field.—Write, giving full information, mentioning ref. 434F, to Central Personnel Services, English Electric Co., Ltd., 34-30, Gillingham Street, London, S.W.1. (7881

BRITISH OVERSEAS AIRWAYS CORPORATION require a senior investigations officer responsible for supervising operational research in both the engineering and flying spheres. This involves the establishment of suitable techniques for analysing airline operations, the derivation of appropriate efficiency factors and trend criteria, and the preparation of reports. Candidates should have had wide experience in this field in addition to holding first-class engineering qualifications. Salary scale from £1,000 to £1,300 per annum according to qualifications and experience.—Applications should be made in writing to Chief Personnel Officer, B.O.A.C. Airways House, Great West Road, Brentford, Middlesex. (7946

WANTED

GROUND position indicators required.—Offers to Box 6812. (7901

BOOKS

85 *FLIGHT* aircraft magazines for sale. July 13, 1950-March 14, 1952. Uninterrupted, new condition. Price £3 10s., near offer.—Box 8324. (7978

Aero & Jig & Tool Draughtsmen in Great Demand

MEN & YOUTHS

There is an insatiable demand for Aero, Jig and Tools, etc., Draughtsmen and Inspectors. So acute is the present shortage that employers are only too anxious to engage those with no previous practical experience who are able to prepare neat and accurate drawings.

QUALIFY AT HOME—IN SPARE TIME
After brief, intensely interesting study—undertaken at home in your spare time—*YOU* can secure an attractive and interesting post as **Aero-Draughtsman.** Numerous vacancies are also available in **Electrical, Mechanical, Plastics,** etc., branches of Draughtsmanship.

FREE GUIDE

The Free Guide contains 132 pages of information of the greatest importance to those seeking such success compelling qualifications as **A.M.I.Mech.E., A.F.R.Ae.S., A.M.I.P.E., A.M.I.M.T., Gen. Cert. of Educ.,** and **B.Sc.,** etc., also **R.A.F. Entry** (Maths., etc.), together with particulars of our remarkable guarantee of

SUCCESS—OR NO FEE

Write now for your copy of this remarkable publication. It may well prove to be the turning point in your career.

NATIONAL INSTITUTE OF ENGINEERING
(Dept. 437), 148-150, HOLBORN, E.C.1
(South Africa Branch E.C.S.A., P.O. Box 8417, Johannesburg).

Instrument Showroom

A.I.D. & A.R.B. APPROVED STOCKISTS
of all types of
WYNN **AIRCRAFT INSTRUMENTS**
Also
AIRCRAFT ELECTRICAL ACCESSORIES
Immediate delivery in quantities

E. D. WYNN & CO.
STAVERTON AERODROME
CHELTENHAM RD · GLOUCESTER
Phone: Churchdown 3264 (3 lines) *Grams: "Wynn, Gloucester"*

K.ED.9.

Jubilee

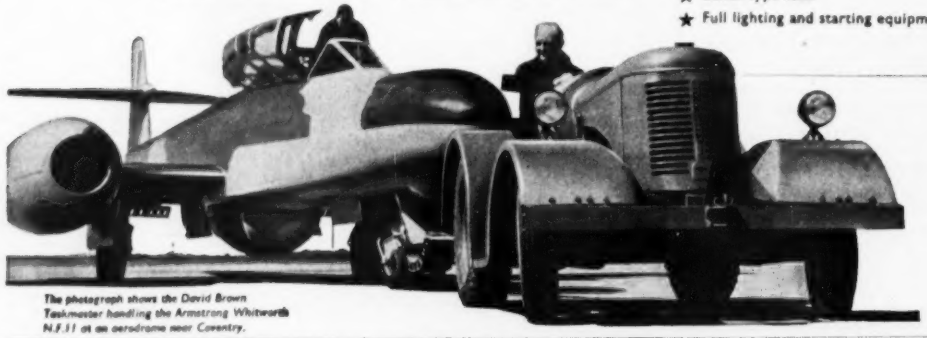
THE FINEST CLIP *in the world*

L. ROBINSON & CO., (GILLINGHAM) LTD.,
London Chambers GILLINGHAM, KENT. PHONE 5282

A Real Tarmac Tug

The David Brown Taskmaster is a real tarmac tug—easy to handle, with all-round driving vision, and turning like a taxi. It hauls all types of modern fighters and medium transport planes with either tricycle or conventional undercarriages. Check the features: eight good reasons why, with Taskmasters on the job, ground movement of aircraft, baggage handling and aircraft servicing is so much more simple and economical.

- ★ O.H.V. Engine developing 39 b.h.p.
- ★ 3,500 lbs. drawbar pull.
- ★ Top speed 22 m.p.h.
- ★ Large tyres for greater traction.
- ★ 6-Position towing hitch.
- ★ Exceptional fuel economy.
- ★ Bench type seat.
- ★ Full lighting and starting equipment.



The photograph shows the David Brown Taskmaster handling the Armstrong Whitworth N.F.11 at an aerodrome near Coventry.

DAVID BROWN

Products of the David Brown Group

Industrial Division

DAVID BROWN TRACTORS LTD., MELTHAM, HUDDERSFIELD, YORKSHIRE

INDUSTRIAL TRACTORS

The outstanding Pleasure . .

Whatever the pleasure—Player's complete it

PLAYER'S NAVY CUT CIGARETTES & TOBACCO [NCC 7808]

MEERLOO SPECIALLY HARDENED STEEL STAMPS...

On A.I.D. Approved List No. 4362/50

LARGE PRODUCTION QUICK DELIVERIES

...make a good impression every time!

JOHN MEERLOO & SONS LTD. 74, LONDON RD. KINGSTON ON THAMES

SUCCESS?

START HERE

The demand for qualified technicians to fill well-paid industrial posts grows daily. An E.M.I. course of training is your quickest way to a key position. Our Home Study courses cover all the subjects listed below. As part of the great E.M.I. Group ("H.M.V.", *Marconiphone*, etc.), we have first-hand knowledge of the technical training required in modern industry. No other college can offer you such a practical background of industrial experience.

POST THIS COUPON NOW

E.M.I. INSTITUTES, Postal Division, Dept. 120, 43, Grove Park Road, Chiswick, London, W.4. *Please send, without obligation, your FREE BROCHURE. I have marked the subjects which interest me.*

☐ **Mech. Eng.** ☐ **Elect. Eng.** ☐ **Draughtsmanship** ☐ **Radio** ☐ **Television** ☐ **Production Eng.** ☐ **Auto. Eng.** ☐ **Aeronautical Eng.** ☐ **Civil Service** ☐ **General Cert. of Education (Matric.).** **Also Courses for A.M.I. Mech.E., A.M.I.C.E., A.M.Brit.I.R.E., A.F.R.Ae.S., CITY and GUILDS EXAMS. in Mech. Eng., Elect. Eng., Telecommunications, etc.**

NAME .....

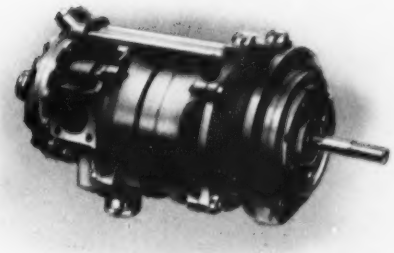
ADDRESS .....

.....

E.M.I. INSTITUTES — The College backed by an Industry ICS

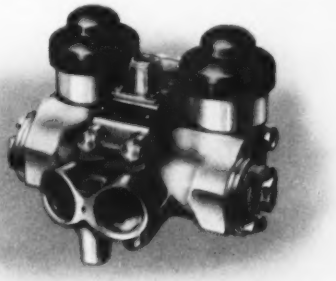
Printed in Great Britain for the Publishers, ILIFFE & SONS LTD., Dorset House, Stamford Street, London, S.E.1, by SUN PRINTERS LTD., London and Watford, Herts. *Flight* can be obtained abroad from the following: AUSTRALIA AND NEW ZEALAND: Gordon & Gotch, Ltd. INDIA: A. H. Wheeler & Co. CANADA: The Wm. Dawson Subscription Service, Ltd.; Gordon & Gotch, Ltd. SOUTH AFRICA: Central News Agency, Ltd.; Wm. Dawson & Sons (S.A.), Ltd. UNITED STATES: The International News Co. Entered as Second Class Matter at the New York, U.S.A., Post Office.

to talk of many things

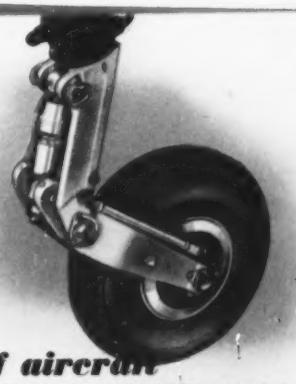


..of PUMPS

..and SEALS



..and SOLENOIDS

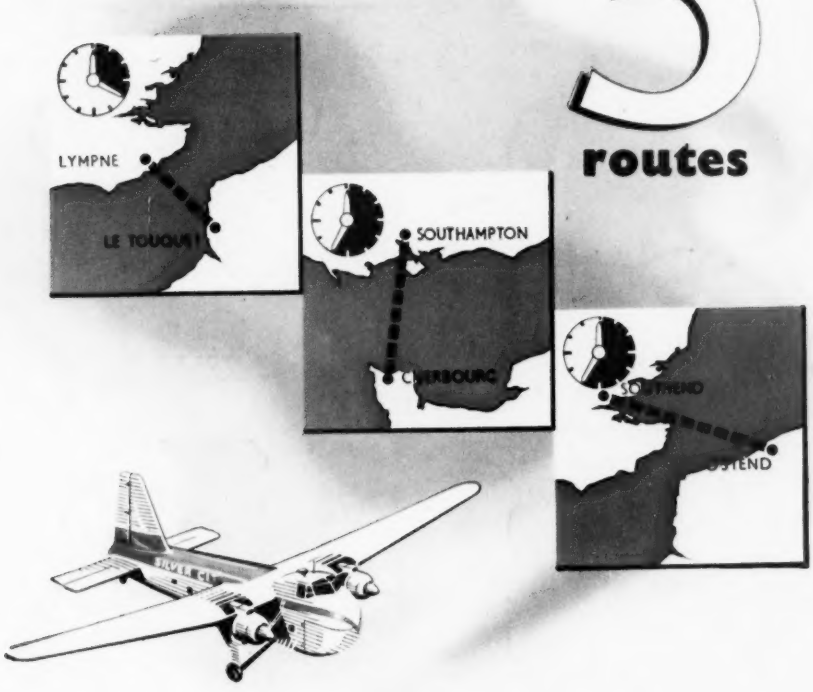


..of aircraft
LIQUID SPRINGS

DOWTY

DOWTY EQUIPMENT LTD., CHELTENHAM, ENGLAND.

Car Ferry service on 3 routes



During the past four years, thousands of British motorists, motor-cyclists and pedal-cyclists have made the 20-minutes flight by "Bristol" Freighter from Lympne to Le Touquet. This year, with fares on the Lympne service reduced for the fourth successive year, new services opened by Silver City Airways will bring Ostend within 35 minutes' flight of Southend, Cherbourg within 35 minutes' of Southampton . . . achievements made possible by the exceptional load capacity and operating economy of the "Bristol" Freighter.

THE Bristol AEROPLANE COMPANY LIMITED · ENGLAND

999A